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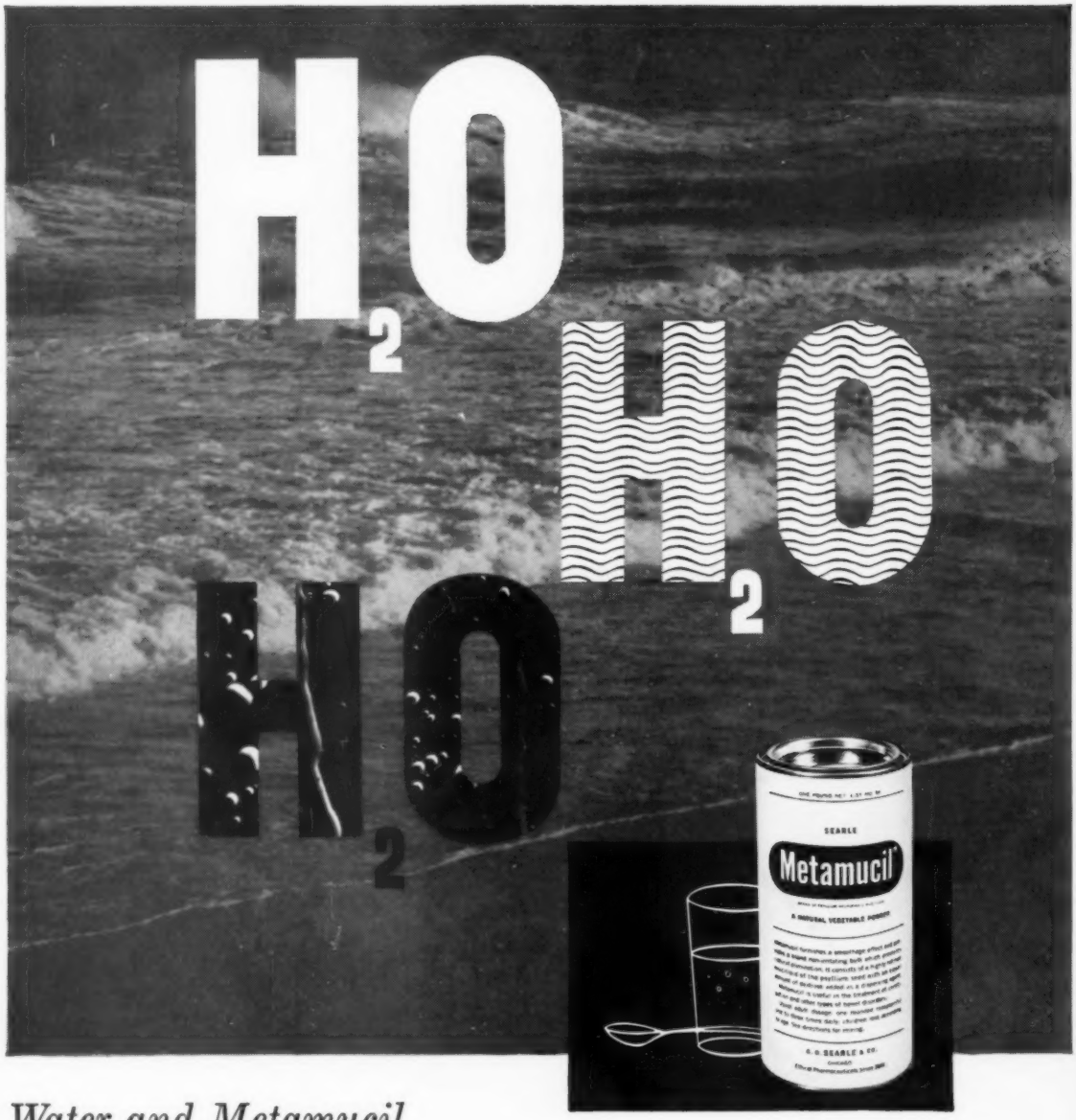

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Volume VII *December 1959* Number 12

CONTENTS

What is Aging? *Frederick C. Swartz* 905

Toxic Effects of a New Antilipaemic Oestrogenic Steroid (Manvene). *P. D. Bedford and Brian Lodge* 911

Treatment of Hypercholesterolemia, Based on a Simplified Theory. *Robert H. Stanton* 916

The Effect of Hydergine on the Cardiovascular System of Elderly People: Electrocardiographic and Ballistocardiographic Studies. *Christ Aravanis and Raymond Harris* 920

The Treatment of Iron Deficiency in the Aged: A Controlled Study. *Jacob Migden* 928

Salmonella typhimurium Septicemia in an Elderly Cardiac Patient: A Case Report. *Joseph P. Caronna and Magda Pijukovic* 933

The Psychiatrist's Role in a Home for the Aging. *Hugh Mullan* 938

Abstracts of Current Literature 947

Author Index for Volume VII 959

Subject Index for Volume VII 964

The American Geriatrics Society 33

The 1960 Annual Meeting 34

Index to Advertisers 40

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WHAT IS AGING?*

FREDERICK C. SWARTZ, M.D.†

Lansing, Michigan

The answer to this question is approached with humility and hesitation. What kind of conclusion can come from one who has no great laboratory in which to test the various hypotheses? What kind of impression can come from one who has no great series of geriatric patients to report? Of the following material you will have to be the judge.

The answer to this question comes from the philosophical armchair of a *family physician*. One who was graduated from a great medical school where teachings followed the tradition of Osler and Halsted. One who spent three and a half years in general practice in a town of 500 people before specializing in internal medicine. One who is acutely conscious of the changing profile of medicine. The average patient knows of the manifold fields of specialization. More often than not he is looking for this type of service. The area of the general practitioner, without some special interest, is being gradually narrowed. In his place is being installed *the family physician*. This name is *not* synonymous with *general practitioner*. It is a modern modification of the old family-doctor concept. In the place of the limited practice of obstetrics, surgery, orthopedics and the like, the family physician has knowledge of all the environmental constituents of living and health. He is akin to the conductor of a great symphony orchestra, using all the specialists of medicine, the local paramedical agencies, the specialists in labor and management, police and government, religion and transportation for the benefit of his patient. You would expect this background to produce one who accepts laboratory data with reservation, and serial observations with skepticism. Most great truths were visualized in the mind of man before they could be traced on the drawing board in the laboratory.

Living and working knee-deep in the chronic diseases, so-called, passing on the physical fitness of the businessman before he takes on a new venture, counseling with the retired, advising the senior citizen after a physical examination on how to make a wise selection of his annuity settlement, helping to raise the older children, along with trying to make a diagnosis, serves to provide a crucible

* Presented at the 16th Annual Meeting of the American Geriatrics Society, Atlantic City, New Jersey, June 4 and 5, 1959.

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and flame that welds experience into opinion. It is from this background the answer is attempted.

From the beginning of medical history the oldster and his problems have been with us. More and more of the literature has been concerned with the medicine and surgery of the aged.

It was assumed before this time that persons who have been around for a definitely long period were somewhat different and were subject to certain specific diseases.

Following logically from this concept the oldster and his inevitable afflictions were segregated in the mind of medicine. What can be done about conditions that arise from the impact of the passage of time? "Keep them happy and comfortable until the end" became the medical philosophy. Until relatively recently a certain surgical department actually imposed age limits which denied patients the opportunity of certain types of surgical treatment if they had passed a named age limit.

Times have changed, however. Largely due to the efforts of the founders of this Society, diseases of the aged have become respectable. Surgical and medical treatment has produced surprising results in areas that before this time were associated with too much risk. The course of illness and surgery in the oldster takes on the same characteristics as the identical lesion in the younger patient.

Medicine has learned that there are no truly age-specific lesions. The usual childhood diseases occur at most any age, and poliomyelitis can occur in persons past the age of 50. The 1954 mortality statistics for the United States reported 98 children below the age of 5 as dying from "arteriosclerotic heart disease," including coronary disease, and these lesions were found in every 5-year age bracket thereafter.

Since the health of our older group is better today than it was twenty years ago and since there are no diseases characteristic of certain age levels, "*What is aging* and why is it helpful to have a fairly concise concept of what it might be?"

CONCEPTS OF AGING

Definitions

Gerontology, according to the dictionary, is the "scientific study of the phenomena of old age and aging." Still quoting from the dictionary, the phenomena of old age and aging include the following meanings, "to become old, to grow old, to show marks of age, to undergo change with age or lapse of time, a diminution of essential qualities or forces as an incandescent light or transformer ages, to become mellow or ripe, or to acquire a desirable quality by standing undisturbed for sometime as wine or varnish ages."

Thus, it can be seen that "old age" and "aging" presented a great many variations in meaning before gerontology became a problem. Most of these concepts find good usage when applied to the failing lamp bulb or the mellow wine. They convey a total picture, the results of which are not due to time alone.

"To become old" and "to grow older" certainly are meaningless phrases and do not constitute true criteria of meaning in the various decades of even our

own generation. The person described as old at the beginning of this century would probably now resent such a classification.

"To show the marks of age" is even more controversial, as there is less and less agreement on what constitutes the marks of aging. Since these so-called stigmata of aging have been subjected to scientific scrutiny, it is found that more often than not they are due to something other than the passage of time.

"A diminution of essential qualities or forces as an incandescent lamp or transformer ages" raises the question as to whether the author had in mind a lamp in "moth balls" or one in use. The difference in the diminution of essential qualities that would be produced by this variation in environment would certainly change the meaning of the phrase.

"To acquire a desirable quality by standing undisturbed for some time as wine ages" is to place emphasis on the factor that has been convenient for expressions of a degree of elegance but which is probably least effective in obtaining the qualities desired. It seems that all would agree that the temperature and light of the wine cellar, the regular turning of the bottles, and many other items of loving care must contribute something to the development of the desirable qualities in good wine. Elusive suggestion resides here for the solution of many of our gerontologic problems.

"To undergo change with age or lapse of time" comes closer to stating a scientific truth. Many of the changes now attributed to the passage of time are due to factors that act in time, and not to time alone. We know practically nothing of these changes that might be wrought by time itself. This may all sound as senseless as the argument of the philosophers of old as to how many angels could stand on the point of a pin, but we hope the object will become clear later on.

Dr Edward J. Stieglitz in his book, *Geriatric Medicine*, called 'aging' a part of living. "All living matter ages, and as it ages, it changes. Aging involves every one of the innumerable aspects of life. It begins with conception and ends only with death. Thus growth, development and maturation are just as much the consequences of the occult processes of aging as are the atrophic conditions and degeneration of senility. Evolution and involution are both affected by aging; pediatrics and geriatrics are closer than many realize. Gerontology is the science of aging in its broadest sense."

This concept of aging is, indeed, a vague condition or state representing a balance between evolution or growth and involution or atrophy. They go hand in hand, growth being in ascendancy in the young and atrophy being in ascendancy in the old. This is further elaborated on to include the involution or atrophy that occurs when certain structures like the thymus or ovary cease to function. They get old. Thus, we become more mixed up trying to understand and account for varying degrees or rates of evolution or involution of certain parts of a whole that is itself of one age.

Would it not be simpler to use those proven tenets of physiology and anatomy which have taught that structure depends on function? Thus, the varying degree of evolution or involution in organs would represent a varying degree of need

and function, and would not be related to time or age. This, at least, extricates us from the dilemma of having one part of the whole older or younger than the remainder.

The effects of time

Aging is the effect or change produced in the organism or the individual by time, and time alone. Each stroke of man's own invention, the clock, must be associated with some meaningful change in the organism. To prove this seems to be a most difficult, if not impossible task. Even in the laboratory animal this problem is far from simple. It is true that most every factor in an animal's life can be fairly well regulated and stabilized. Changes which occur in time can be said to be associated with the passage of time. Some of these major changes, however, may be due to the fact that the animal is incarcerated in a cage or that there may be some personality differences between him and his tender. In any case, removing all psychosomatic, physical, psychic, bacterial and viral causes for change, we come up with the sum total of the effects caused by aging. If time produced no effects, then the removal of the foregoing causes should produce a situation where immortality would result. It is suggested by Carrel's growing a bit of the heart of a chick embryo that if all environmental factors producing change are controlled, the one-celled animal tends to be immortal. This does not mean that the one cell continues to live on unchanged throughout eons of time, but that its likeness is perpetuated in subsequent daughter-cells without leaving behind a corpse. R. E. Tunbridge says it this way, "Alexis Carrel in his experimental work suggested that environmental factors were highly important, if not the most important factor in senescence."

The one-celled animal in the proper media may be said to possess immortality in that the involutionary process of aging is not evident, so long as all environmental factors are controlled. In the light of our concept the cell must age, that is, change in some way between the time of one cell division and the next. Although the proof may be impossible to obtain at the moment, there must be some difference between a daughter-cell aged one second and a daughter-cell aged ten minutes, just before the next division. This must be true, since in a controlled environment the division occurs as a function of time and a single cell of a certain species will have daughter-cells only after the passage of so much time in a controlled environment. To measure this change in a unit of time is probably the purest estimation of the effects of time on protoplasm.

This type of immortality is almost entirely outside the realm of control or direction by the organism. Protection for the individual cell from its environment, including its own waste products, and continuity of the race rests on the weak reed of environmental stability. Realizing these defects evolution proceeds in the direction of exercising more and more control over these environmental factors. The age of specialization is begun. Groups of cells were set aside to take care of irritability, growth, reproduction and temperature so as to regulate the environment of the complex individual or community of cells. Thus, potential but hazardous immortality of the individual cell was sacrificed for what seemed

to be less immortality potential but a more certain definite life span. The proof that this was a wise choice lies in the fact that the most complex of all creatures has managed to become the dominant force of the universe while the unstable, uncontrolled environment has kept the one-celled animal at that previous level.

Environmental factors

Disease has been described as the state of being out of harmony with one's environment. Bacteria, viruses and malignant growth may disturb the internal environment enough to cause disintegration of the individual. The internal environment, body chemistry, temperature and pulse operate within narrow limits and are only mildly influenced by age. Environmental stress and physical agents may operate through wider limits but they produce deleterious effects which end in disease just as surely and certainly as do bacteria. It would seem then that the resulting picture of any disease process would be little affected by age as such, except as this particular disease might be influenced by the preponderance of evolutionary or involutionary processes at work at the moment. The suggestion is evident that the effects wrought by time, and time alone, are the same from the start of life to its end and vary only as the protoplasmic substrata vary as the result of previous time or stress. Thus most of the changes associated with so-called senescence or senility are the result of the impact of environmental phenomena, both internal and external, to which the individual has made a partially satisfactory adjustment. A totally unsatisfactory adjustment results in death. To improve longevity, then, one is not left with as few tools as seemed to be the case at first glance. We are beginning to understand some of the psychosomatic effects of stress on individual health and happiness. The application of this understanding early in a person's life may well bring about better adjustment, better emotional rewards, better health and longer life.

In some areas of medicine, pessimism reigns supreme. The enthusiastic reports of increased longevity are dampened by the concept that this increased number of years has been purchased only by the treatment and prevention of contagious and infectious diseases and in the improvement of the mortality rates of infants. It is pointed out that actually there has been little or no increase in life expectancy of the man who is 50, 55 or 70 years of age. There are just more people living to that age to start with who are fugitives from the infectious diseases and accidents. This is all well and true, but the spirit in which this is pointed out gives the impression to the reader and listener that the outlook is incapable of change.

NEW PROFILES IN GERONTOLOGY

Even though the previous concepts are incapable of proof at the present time, the idea that the degenerative processes and diseases of man are the result of stress and strain and not the result of monotonous hammering of life's chronometer points directly to the fact that something definitely can be done to improve even the life expectancy and life worthwhileness of those who are now in advanced years. Most any student of preventive medicine and physiology will agree that, could we apply systematically all the knowledge which lies within

our hands today to the total population of the United States, we could increase the life expectancy by ten years within one generation. One needs only to point to: 1) the improvement in physical well-being which could be accomplished by weight reduction programs in 28 per cent of the American people; 2) education and mental hygiene programs which should produce more happiness and less frustration for more people; 3) increased use of physical education in order to preserve man's physical body and prevent the disabling diseases such as fibrositis, osteoarthritis and bursitis; 4) the encouragement of mental acuity and habits of study so that persons living into the advanced years do not suffer from the competition of the young so far as intellectual abilities and capacity are concerned; 5) rehabilitation in the aged person, which pays just as large dividends as rehabilitation in the younger person; and 6) the nurturing of motives to make the foregoing possible.

Such a consideration of gerontology brings into focus the new profile of medicine as it exists today in this country—the emphasis on the chronic disease. Few there are who realize it yet, but the impact of gerontology upon medical education, health, welfare, hospitalization and rehabilitation will sweep across the American scene with the force of hurricane "Connie" or "Diana." Thus we have before us great vistas of one challenge after another which will keep those with imagination busy plotting the course of the generations to come.

In the light of fundamental concepts, we are ready to define aging from a medical standpoint as that effect of time on protoplasm which prepares the individual cell in a proper environment for the next cell division. This definition is unproved and may or may not be true, but will not change our fundamental concept.

All the present so-called stigmata of senescence and senility are the result of the impact of environment on the individual and can be altered by training and preparation, education and motivation.

TOXIC EFFECTS OF A NEW ANTILIPAEMIC OESTROGENIC STEROID (MANVENE)

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This communication reports the results of a small but carefully controlled clinical trial of a new antilipaemic oestrogenic steroid, initially designated SC-6924 and now called Manvene,[1] after initial tests in the United States of America on man and animals had yielded promising results. The objective of the trial reported here was strictly limited to determining the toxicity of the drug and whether possible side-effects would permit its use as a long-term antilipaemic agent. An arbitrary dosage schedule was decided upon after discussion with the heads of the manufacturers' Research Division, on the basis of available results and the information required. The drug was supplied by the manufacturers in tablet form, as was an apparently identical but pharmacologically inert "dummy" tablet which was used as a control.

METHOD AND SOURCES OF DATA

The patients concerned in the trial were chosen at random from men routinely attending the Out-Patient or Follow-up clinics at the Geriatric Unit, Cowley Road Hospital, Oxford. Their selection was determined solely by evidence of degenerative arterial disease according to certain criteria. The nature of the trial was fully explained and participation in it was voluntary in all instances and eager in most; there were no refusals. Twenty-four male patients took part in the trial; their ages ranged from 61 to 81 years (average 74) and all had evidence of degenerative arterial disease as shown by one or more of the following criteria: 1) electrocardiographic evidence of myocardial infarction with or without a history of angina pectoris or of heart failure, 2) peripheral vascular disease as shown by a history of intermittent claudication and by objective evidence of defective arterial blood supply in the legs, with or without gangrene, or 3) cerebral arterial thrombosis with a residual neurological deficit. The 24 patients were allocated alternately to two numerically equal groups of 12, designated A and B. The two groups proved (albeit fortuitously) to be statistically similar in all modalities, such as age, height, weight, and disease incidence and duration, and were therefore a valid match for clinical trial.

(The experiment was unfortunately interrupted and delayed at the outset because of the late arrival of a batch of dummy tablets. This report, however, takes account only of those 24 patients in whom the whole study was completed as planned.)

Formal psychological tests were not performed.

The active tablet to be investigated (containing SC-6924) was designated X and the apparently identical but pharmacologically inert control or dummy tablet was designated Y. The tablets were issued weekly to each patient under trial by a specified person who had no other function in the study. The patients were unaware throughout the whole study of the designation or identity of the tablet they were receiving or of the side-effects possibly

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[1] Manufactured by Searle and Co., Chicago, Illinois, U. S. A., who describe it as "a synthetic crystalline powder insoluble in water and slightly soluble in vegetable oils, with a 'lipid-potency' 20% that of estrone with only 1% of its estrogenic activity."

to be anticipated. Initial case-selection was determined by two clinicians in collaboration. Weekly clinical assessments were made by one investigator who neither saw nor handled the tablets, and who was unaware of the identity of the tablet being administered at the time of each assessment. Both groups of patients received either the X or Y tablets for a period of eight weeks. A gap of one month followed, during which weekly observation continued but no tablets were given. The trial was then "reversed," in that the treatment was switched in the two groups so that if a patient in group A had received tablet X in the first eight weeks he would receive tablet Y in the second eight weeks (and vice versa). This treatment was continued for a second period of eight weeks and the trial was closed a month later (*i.e.*, a total of six months' treatment and observation). The trial was thus of the double-blind, self-controlled, reversed type, each patient functioning as his own control, and both patient and investigator being unaware of which of the active or dummy preparations was being taken throughout.

Patients were interviewed alone by one clinician. All the questions on a prepared list were put to each patient at his weekly attendance at the Out-patient department and the answers were recorded. At the end of the formal questionnaire, each patient was also asked whether he had anything to add.

During each half of the trial (*i.e.*, over the first six weeks of each eight-week period of tablet-administration) the daily dose was progressively increased (by 1 tablet weekly) from 1 tablet per day at the commencement of the period to 2 tablets three times a day at six weeks (comprising a dosage schedule of SC-6924 increasing from 5 mg. daily to 30 mg. daily).

After the trial was completed, the results were collated and assessed by the other clinician.

RESULTS

The results are charted in Table 1, where the number of patients in each group receiving tablets X and Y are tabulated according to their symptoms and physical signs during administration. It is clear that the active tablet, X, gave rise to symptoms and signs much more frequently than did the dummy tablet, Y.

Gastro-intestinal symptoms, when present, appeared early (*i.e.*, with low dosages and within the first two weeks of treatment) and tended to persist throughout the period of administration. This was the case in both groups, but these symptoms were much more common in those taking tablet X.

Symptoms and signs referable to the breast were slower in developing. Pain was noticed in either the third or fourth week; and in all patients who complained of breast symptoms, the mammary tenderness or hypertrophy was manifest by the fifth week.

It may be seen in Table 1 that gastro-intestinal symptoms were frequent. Although in only 3 cases were they so severe as to jeopardise continued participation in the trial, they were obtrusive in many instances and would almost certainly have led to the abandonment of the drug by several (at least 5) patients had supervision not been so close and persistence less warmly encouraged.

Mammary symptoms were frequent and in 2 cases would almost certainly have caused the patients to default had they been fully aware of the association between symptom and tablet, and had support and encouragement been less freely forthcoming.

A more difficult group of symptoms to assess was that including libido and

TABLE 1

Incidence of Symptoms

Symptoms	Group	A	B	A	B
	Tablet	Y	X	X	Y
Gastro-intestinal:					
Anorexia		1	6	5	2
Nausea		0	4	6	0
Vomiting		0	4	5	0
Diarrhoea		1	0	0	0
Constipation		1	2	1	0
Sexual:					
Diminished libido		0	2	3	0
"General drive":					
Diminished		1	8	7	0
Increased		1	1	0	1
Cutaneous:					
Rash		0	1	2	0
Mammary:					
Pain		0	6	7	0
Tenderness		0	8	7	0
Hypertrophy		0	5	4	0
Psychological:					
Well-being		2	1	2	1
Depression		1	2	0	0
Other symptoms:					
Headache		1	1	1	2
Overall subjective impression:					
Better		1	1	0	1
Worse		1	9	9	1
No change		10	2	3	10

"energy." There can be no doubt, however, that the active preparation did lead to a diminution in "general drive," which the affected patients found difficult to describe but of which, despite their age, they were well aware. In 1 patient of Group B impotence (failure of erection) developed in the third week of treatment with tablet X. This symptom subsided on withdrawal and recurred on re-institution of tablet X, but did not occur during administration of tablet Y.

No other symptom was obtrusive, and no other significant difference between the groups emerges from this study.

Incidental results, not strictly pertinent to this enquiry but of possible interest, were as follows:

There was no oedema or other evidence of water and salt retention.

Weight did not vary more than 4 pounds (± 2 pounds) in any subject during the period of investigation, and showed no difference as between groups A and B and tablets X and Y.

Blood pressure, taken in standard recumbent and sitting positions, in some

cases showed a wide variation in the systolic reading but was entirely unrelated to the type of tablet being taken and was inconsistent as between groups and individuals.

Neither plasma protein nor serum cholesterol levels showed any significant change during the period of investigation; in particular, no difference between groups was observed.

DISCUSSION

The small number of patients concerned in the trial precludes the use of simple methods of statistical analysis, because the "degree of improbability" as between the investigated groups is too great. Nevertheless, the form of the study and the character of its results are such as to permit certain conclusions to be validly drawn. We are much indebted to the statisticians of the Oxford University Department of Social Medicine for their generous help in compiling the following commentary:

"Survey shows that symptoms occurred much more commonly with tablet X than with tablet Y. It remains to be argued whether these symptoms can in fact reasonably be construed to be side-effects of the drug under trial.

If tablet X had not contained the active ingredient, it could be firmly asserted that there is no evidence that the drug is responsible for the side-effects noted, provided that the placebo tablet Y is inert and non-irritant (as is in fact the case). Tablet X does, however, contain the active ingredient and there are therefore two reasons for believing that the symptoms complained of and the signs observed were veritable side-effects of the drug. First, complaints were more frequently reported with the administration of tablet X in related symptom-groups (*e.g.*, those referable to the breasts). Second, of all the symptoms tabulated, those in fact which did occur most commonly were the very ones of which a lay patient would have been least likely to complain had there not been a specific (*i.e.*, drug side-effect) relationship (again, *e.g.*, tenderness of the breasts). Moreover, all the objective physical signs that occurred, did so in those patients taking the active tablet X. Finally, all additional evidence is congruous with this relationship and none is contrary; (*e.g.*, one patient who took the inert tablet Y without trouble refused and was only persuaded under considerable pressure to continue taking tablet X because of vomiting; a further patient in Group B receiving tablet X spontaneously complained of impotence which rapidly subsided (within 5 days) after completing the course and did not recur with tablet Y)."

The indications for treatment with a drug such as Manvene (SC-6924) (if indeed it proved to be a successful antilipaemic agent, which factor is not within the terms of reference of this report) are numerous. Of necessity, administration would be requisite for long periods. Such therapy would be justified or feasible only if, 1) the side-effects were trivial in severity or, if more severe, were infrequent in incidence; or 2) the benefits far outweighed the disadvantages. The results of this trial of Manvene show, within the terms of reference, that such is not the case. Gastro-intestinal upsets were quite severe and would strongly

militate against the protracted use of this drug. The same is true of diminution in virility, particularly with regard to younger men. Gastro-intestinal upsets would be especially unwelcome during the acute stages of occlusive vascular disease (*e.g.*, coronary or cerebral thrombosis) and would then constitute absolute contra-indications to the use of the drug. The fact that the average age of the patients concerned in this trial was greater than that at which drug therapy of this nature would be optimally initiated is a condemnatory rather than a mitigating factor.

CONCLUSIONS

The antilipaemic oestrogenic steroid, Manvene (SC-6924), has frequent toxic effects which are commonly troublesome and occasionally severe. Many of these side-effects occur during administration of fairly small dosages of the drug, and some of them completely contra-indicate its continued administration at the very junctures when interruption of medication might be most undesirable.

Manvene is therefore not suitable for wide use or long-term administration.

TREATMENT OF HYPERCHOLESTEROLEMIA, BASED ON A SIMPLIFIED THEORY

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There have been many learned treatises on the chemistry of cholesterol, the mechanism of its entry into the blood stream, and its effect on the arterial system. Some of these reports are quite technical and are filled with organic chemistry formulas designed to prove the authors' contentions. However, there seems to be a chain of events or conditions which, if taken into consideration, affords a simplified explanation of hypercholesterolemia.

Many of us experience embarrassment at being called upon to make an extemporaneous speech at a medical meeting, a PTA discussion or other similar occasion, because our mouths get dry; the autonomic nervous system has turned off the manufacture of saliva. Our present-day strenuous lives cause us to draw heavily upon our output of nervous energy. Our autonomic nervous system is like some electric systems made for farm use: turn on the lights in the farm house, and they are normally bright; turn on the milking machine in the cow barns, and the lights become dim; then turn on the motor in the saw mill, and the farm house lights almost disappear.

The human nervous system is too often subjected to such strain, because of mental or emotional involvement, and the results are inevitable. For instance, the nervous energy available for the pancreas is reduced and hence the manufacture of pancreatic juice is less than normal. This deficiency of pancreatic lipase in the duodenum results in faulty splitting of the fatty acids into diacids and triacids instead of the necessary monoacids. In the process of absorption into the blood stream, these complex molecules end up as excessive amounts of cholesterol.

The question is, what should be done to break this faulty chain and reduce the blood cholesterol level to normal. It is rather generally accepted that hypercholesterolemia is a definite factor in the production of atherosclerosis. Thus it is most desirable to control the blood cholesterol level by as simple and foolproof a means as possible.

FACTORS IN HYPERCHOLESTEROLEMIA

The following are some of the main influences in the development of hypercholesterolemia:

Genetic factors. The structure of blood vessels has something to do with the tendency toward development of plaques. We cannot do much about this tendency in certain people, but if the blood cholesterol concentration is kept at a

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normal level there will be a reduction of plaque formation in the vessels in which there is a genetic structural fault.

Estrogens. Atherosclerosis is not as prevalent among females as among males, until after the age of the menopause—a time when women undergo a decrease in their estrogen levels. This is the basis for the current vogue of estrogen and androgen-estrogen therapy.

Diet. The low-fat diet has been rated as unphysiologic because it promotes stasis and consequently fails to provide an adequate stimulus for gall-bladder contraction. Blood cholesterol concentration can be reduced, and maintained at a normal level by restricting animal fats simply to a reasonable intake, not necessarily minimal. Reduction of the intake of animal fat for any length of time means reduction in the intake of adequate amounts of the fat-soluble vitamins. Thus a high level of cholesterol is exchanged for a low level of fat-soluble vitamins—a poor trade. Some other method is preferable if it can be devised.

Thyroid hypofunction and cardiac disease. Thyroid hypofunction has been listed as a factor in hypercholesterolemia, but this is not proved. However, 14 of the last 15 patients with coronary disease that I have treated, manifested some degree of hypercholesterolemia. The exception was as follows:

> For seven years, this 56-year-old man had come in yearly for physical examination and an electrocardiogram. The electrocardiogram had always been normal. He contracted virus gastro-enteritis with nausea, emesis and diarrhea. It was typical of the cases seen epidemically in Southern California, which last only twenty-four to thirty-six hours. Five days after this attack, he started to carry a Yule log up to his second-floor apartment. Half way up he was seized with typical coronary pain. He couldn't drop the log, so he continued up the remaining 10 or 12 steps, put it down, and sat in a nearby chair. An electrocardiogram obtained half an hour later with a portable machine showed the typical early findings of coronary disease. In the hospital, the patient progressed reasonably well for six days, until Christmas. Orders were left on the chart regarding visitors—no more than 2 at a time, not for more than ten minutes. His family did not abide by the orders, and 2 sons with their wives and 4 or 5 children descended to make Christmas a better day for him. After two hours he became almost hysterical, and had severe pain. Death followed within a few minutes. His blood cholesterol level had been normal. Postmortem examination showed desquamation of the lining of the heart and aorta. A small piece of loosened tissue had lodged in the coronary artery, causing the first attack. It had then moved along until it completely occluded the coronary artery, causing the second and terminal attack.

In cases of hypothyroidism two factors must be considered. First, the slow pulse (35 to 64 per minute) favors formation of a clot or thrombus at the site of any cholesterol plaques that may be in the coronary artery. These could vary in extent, but be sufficient to reduce the blood flow in the distal portions of the affected artery. Secondly, it is possible that the very slow pulse rate does not allow transportation of sufficient blood to the distal portions of the coronary artery, whereas a normal pulse rate would supply the heart muscle with an adequate amount of blood. The degree of ischemia of the heart muscle may be sufficient to cause muscular spasm. This would explain the rapid recovery of

these patients when thyroid medication is started and the heart rate is restored to normal.

REDUCTION OF BLOOD CHOLESTEROL LEVEL

A study of 64 cases of hypercholesterolemia has been made recently, in order to determine the effects of safflower oil and corn oil in reducing the concentration of blood cholesterol.

In all cases, examination of the feces showed the presence of undigested fats, ranging from 1 plus to 4 plus in amount.

In 34 cases the duodenal fluid was aspirated and examined for content of lipase, protease (trypsin) and amylase. In all instances the levels of these enzymes were low, especially that of lipase. This suggested the desirability of using some form of pancreatin or other fat digestant in the treatment of patients with hypercholesterolemia.

All 64 patients were given either safflower oil with pyridoxine, or corn oil with pyridoxine[1] (usually Stuart's product, which includes vitamin E, but sometimes Armour's Arcofac or Brown's Delb-e-Nol). The dosage was 1 tablespoonful three times daily.

Blood cholesterol levels were determined after four weeks. In some patients the levels were normal by that time; in all, the levels were normal by the end of six weeks.

Biochemists have shown that the conversion of linoleic acid to arachidonic acid requires pyridoxine (vitamin B_6). Safflower oil or corn oil without B_6 does not seem to be effective in reducing the blood cholesterol level. Patients should be warned not to rely on these unsaturated oils unless the pyridoxine is included.

Although evidence based on a single case is not conclusive, we should like to present the findings in a patient who had consulted a noted oculist and was told that the retinal blood vessels were so infiltrated with cholesterol that the condition was causing his symptoms. Our determinations of the blood cholesterol concentration showed a normal level. Nevertheless, corn oil with pyridoxine (1 tablespoonful with each meal) was prescribed. After twelve weeks, the oculist reported marked reduction in the amount of cholesterol in the retinal vessels; after six more weeks, there was only a minimal residue.

Another preparation which will reduce blood cholesterol concentration is nicotinic acid in large doses. I personally tried a single dose of nicotinic acid to see what reaction I would get. Within a minute my skin became very red, and felt like "prickly heat." This lasted for about one hour. One pharmacal company in its brochure regarding its product of nicotinic acid states, "it may give rise to reactions of cutaneous flushing, gastric distress, sensations of warmth, tingling, and itching, burning of the skin, dizziness, faintness, increased gastrointestinal motility, headache, and sebaceous gland activity." It is also reported that large doses of nicotinic acid reduce the blood and tissue levels of riboflavin. These effects can hardly be considered desirable. According to my experience, it would

[1] Thanks are due to Mr. Arthur Hannish of the Stuart Company, Pasadena, California, for his generous supply of safflower oil and corn oil with pyridoxine.

seem that nicotinic acid gives quite a jolt to the autonomic nervous system controlling the blood vessels. What effect then, will it have when used over long periods?

Heparin is another preparation currently used to reduce the concentration of blood cholesterol. According to many reputable reports, it will reduce the cholesterol level without producing appreciable changes in prothrombin time. This may be so, but in 2 cases of coronary disease that had been under treatment by cardiologists elsewhere, I found the prothrombin time to be 55 per cent and 60 per cent of normal.

Though nicotinic acid and heparin reduce the level of blood cholesterol, there is no assurance that the effects will remain physiologic during prolonged periods of administration. There seems to be no reason for choosing them in preference to unsaturated oils with pyridoxine, when the latter will produce optimum results; moreover, these results are achieved without the prospect of untoward effects in later life, for these oils have a blotter action and do not produce alterations in the vascular system.

CONCLUSIONS

Reduction of blood cholesterol concentration may best be accomplished by:

1. Reduction of the intake of fat by avoiding fried foods, fat on meat, gravies and cooked fats in general, while allowing a moderate intake of cream, butter and vegetable fats.
2. Regular medication with pancreatin or other fat digestants after meals.
3. The use of an androgen-estrogen preparation daily.
4. In cases of hypothyroidism with a pulse rate less than 68, administration of thyroid in sufficient dosage to elevate the pulse rate to normal (about 72).
5. The use of safflower oil or corn oil with pyridoxine (1 tablespoonful before each meal) until the blood cholesterol level is normal; then 1 tablespoonful a day indefinitely.
6. If plaques in the arteries are suspected or are seen in the x-ray films, administration of an oral anticoagulant sufficient to keep the prothrombin time at about 40 per cent of normal.
7. If symptoms of coronary disease are present, medication with some of the various preparations of pentaerythritol tetranitrate.

For simple reduction of the blood cholesterol level, administration of corn oil with pyridoxine is all that is necessary.

THE EFFECT OF HYDERGINE ON THE CARDIOVASCULAR SYSTEM OF ELDERLY PEOPLE: ELECTROCARDIOGRAPHIC AND BALLISTOCARDIOGRAPHIC STUDIES

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Hydergine contains equal proportions of dihydroergocornine, dihydroergocristine, and dihydroergocryptine as the methanesulfonates (1). It is prepared by the hydrogenation of natural alkaloids of ergot (2). The process of hydrogenation alters the pharmacologic properties of ergot alkaloids, which are known to possess mild adrenergic-blocking and strong vasoconstrictor action because of their effect upon smooth muscles. The hydrogenated alkaloids have a strong adrenergic-blocking action, but virtually no ability to stimulate smooth muscle. They are less toxic and possess less pronounced emetic action than the natural alkaloids (3, 4).

Among the many studies of the pharmacologic properties of Hydergine and of its effect upon blood pressure, heart rate, and central and peripheral circulation (4–25), none has dealt strictly with concurrent changes produced in the electrocardiogram and the ballistocardiogram. In fact, conflicting observations have been made as to the electrocardiographic changes that Hydergine may produce.

To re-evaluate the action of Hydergine, the drug was given to 45 elderly persons, and changes in blood pressure, pulse rate, the electrocardiogram, and the ballistocardiogram were studied after its injection.

MATERIAL AND METHOD

Forty-five elderly persons at the Ann Lee Home in Albany, New York, served as the test subjects. Most of them were between the ages of 60 and 80 years (Table 1). They were divided into two groups—those with hypertension and those with normal blood pressure. Each observation or test was made in the morning, the patient having been instructed not to eat or smoke beforehand. After the patient had rested fifteen minutes in the supine position, the blood pressure and heart rate were determined and an electrocardiogram and a ballistocardiogram recorded. The electrocardiogram was made with a Sanborn direct-writing machine, using the 12 conventional leads. The Arbeit type of magnetic machine was used for the ballistocardiogram, and the displacement, velocity and acceleration traces were recorded. After these records had been made, 1.0 cc. of Hydergine (0.3 mg.) was injected subcutaneously. Half an hour thereafter, the blood pressure, heart rate, electrocardiogram and ballistocardiogram were recorded again. They were recorded also one hour following the injection. Subjective complaints and objective findings were noted during this time and later.

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RESULTS

The effects of Hydergine upon heart rate, blood pressure, the electrocardiogram, and the ballistocardiogram were as follows:

Heart rate. The average heart rates for patients in the decades between 40 and 80 years of age, before and after the injection of Hydergine, are given in Table 2. In each age group, the average heart rate fell during the first hour of observation. The maximal reduction of 23 beats per minute in the average rate took place in persons 70 to 79 years of age. In the other age groups, the reduction in the average rate was approximately the same −14 beats per minute. The greater part of the reduction usually took place during the first half hour. As the rate was faster before injection, the reduction was more pronounced. In 2 persons with heart rates initially of 100 per minute, no reduction occurred. No differences were observed between the sexes in the effects of Hydergine. The average reduction in heart rate noted in hypertensive subjects was less than in those with normal blood pressure.

Blood pressure. The average blood pressure in persons in the different age groups before and after the injection of Hydergine is shown in Table 3. A progressive increase is apparent with age. Prior to the injection of Hydergine, the systolic pressure in persons 50 to 59 years of age was on the average 22 mm. Hg higher than that of persons 40 to 49 years old. The difference between these two groups in the average diastolic pressure was 13 mm. No further significant increase in systolic pressure was noted in persons past age 60. The highest average diastolic pressure was found in the 50–59 year age group. The highest pulse pressure, 77 mm. Hg, was noted in the 70–79 year age group, probably as a

TABLE 1

Age Distribution

Age (yrs.)	No. of Patients
40–49	4
50–59	8
60–69	20
70–79	13

TABLE 2

Average Heart Rate by Age Groups, Before and After Injection of Hydergine

Age (yrs.)	Heart Rate before Hydergine	Heart Rate Half Hour after Hydergine	Heart Rate One Hour after Hydergine
40–49	79	71	64
50–59	90	79	76
60–69	76	70	63
70–79	87	66	64

result of sclerosis of the aorta. Conversely, the lowest pulse pressure, 59 mm. Hg, was found in persons 40 to 49 years of age.

The blood pressure fell following the injection of Hydergine in all subjects except one in whom the pressure initially was 200/100. Most of the reduction took place in the first half hour; it ranged from 11 to 23 mm. Hg for the average systolic pressure, and from 2 to 10 mm. for the diastolic pressure. However, at the end of one hour, the fall in the average systolic pressure was approximately the same in all age groups, that is, 20 to 26 mm. No significant fall occurred in the average diastolic pressure of persons 40 to 49 years of age, the decrease being only 3 mm. In the remaining subjects, the fall in the average diastolic pressure was 8 to 10 mm.

When data were analyzed separately for hypertensive (Table 4) and normotensive subjects (Table 5), the fall in the average systolic pressure after one hour was found to be more pronounced in the former group, that is, 38 mm. Hg as compared with 18 mm. in the normal group. That most of the reduction occurred during the first half hour after injection was evident in this analysis also. The fall in the average diastolic pressure did not differ significantly in the two groups; it was 12 mm. in hypertensive, as compared with 3 mm. in normotensive, subjects at the first hour.

TABLE 3

Average Blood Pressure (mm. Hg) by Age Groups, Before and After Injection of Hydergine

Age (yrs.)	Blood Pressure before Hydergine	Blood Pressure Half Hour after Hydergine	Blood Pressure One Hour after Hydergine
40–49	136/77	125/75	116/74
50–59	158/90	135/82	132/82
60–69	157/86	136/76	133/73
70–79	164/87	145/80	141/77

TABLE 4

Average Blood Pressure (mm. Hg) in Hypertensive Patients Before and After Injection of Hydergine

Before Hydergine	Half Hour after Hydergine	One Hour after Hydergine
198/104	172/94	160/92

TABLE 5

Average Blood Pressure (mm. Hg) in Normotensive Patients Before and After Injection of Hydergine

Before Hydergine	Half Hour after Hydergine	One Hour after Hydergine
139/73	123/70	121/70

TABLE 6

Evaluation of the Electrocardiogram Before and After Injection of Hydergine

Electrocardiogram	Before Hydergine (No. of patients)	Half Hour after Hydergine (No. of patients)	One Hour after Hydergine (No. of patients)
Normal	11	13	14
Slightly abnormal	27	27	26
Moderately abnormal	6	4	4
Severely abnormal	1	1	1

TABLE 7

Evaluation of the Ballistocardiogram Before and After Injection of Hydergine

Ballistocardiogram	Before Hydergine (No. of patients)	Half Hour after Hydergine (No. of patients)	One Hour after Hydergine (No. of patients)
Normal	3	3	5
Slightly abnormal	2	4	3
Moderately abnormal	11	9	11
Severely abnormal	20	20	17

Electrocardiogram. Eleven persons (24.4 per cent) had a normal electrocardiogram before the injection of Hydergine. In the remainder, the abnormalities varied from minor changes in the T-wave and the S-T segment to more significant changes in the T-wave and the QRS complex. Most of the tracings showed a flat or inverted T-wave in leads I, avL, and V_4 to V_6. The electrocardiogram in 5 persons indicated left ventricular hypertrophy and strain. One subject had an old posterior myocardial infarction. Another had a complete right bundle-branch block.

Half an hour after the injection of Hydergine, 26 per cent of those persons with minor T-wave and S-T segment changes showed some electrocardiographic improvement. Although these improvements were noted, they were not always necessarily great enough to change the grading as listed in Table 6. The T-wave became taller and the S-T segment less depressed. Complete normalization of the tracings occurred in 2 persons. Improvement also took place in 2 persons who originally had major electrocardiographic abnormalities.

At the end of the first hour, complete normalization had occurred in 1 additional tracing. Three showed more improvement in the T-wave and S-T segment. In a few cases, the R-wave over the left ventricle became 40 to 70 per cent taller as compared with its original pattern. The improvement that had occurred at one-half hour in other electrocardiograms persisted. Elevation of the S-T segment as a probable vagotonic effect occurred in 5 instances. No deterioration in the electrocardiogram was noted, although the concomitant fall in blood pressure was not insignificant. Table 6 shows the evaluation of the electrocardiograms before and after the injection of Hydergine.

Ballistocardiogram. Prior to medication, 39 persons (86.6 per cent of those in the study) had an abnormal control ballistocardiogram, the severity of the abnormality varying from grade II to grade IV by Starr's classification. Data on 36 persons for whom technically adequate tracings were recorded following the injection of Hydergine are included in Table 7. Improvement consisting of an increase in the amplitude of the complexes and a decrease in the abnormality of this pattern occurred in 25.6 per cent of the 36 persons with BCG abnormalities. Complete normalization occurred in 2 instances. In 3 instances, the amplitude of the complexes diminished at the end of the first hour.

Side-actions. In this series, Hydergine caused no undesirable side-effects.

DISCUSSION

This study was directed toward discovering the effect of Hydergine upon the cardiovascular system of elderly people. The drug is known to act both centrally and peripherally (3, 4). Its major central effect consists of inhibition of the vasomotor center with simultaneous damping of the pressoreceptor reflexes. This action lowers vascular tone, produces peripheral vasodilatation, and diminishes arterial tension. The peripheral action consists primarily of adrenergic blockade, which increases peripheral vessel dilatation and protects against sympathetico-adrenergic stimuli. There is also a central action on the vagus, which accounts for the slowing of the heart rate. Clinically, Hydergine causes a fall in blood pressure, reduces nervous tension, lowers vascular resistance, and increases blood flow (cerebral, peripheral and renal). It relieves subjective complaints of headache, dizziness, fatigue, and intermittent claudication, and improves poor memory and concentration in elderly people (26-30).

Therapeutically, the effect of Hydergine in slowing the heart rate is desirable because it reduces the cardiac load and improves diastolic filling, thus increasing cardiac efficiency (10, 31). This contrasts with the effects of many hypotensive agents, particularly with those of ganglionic-blocking agents which may produce tachycardia and, with a drop in blood pressure, deterioration in coronary filling and cardiac function. In this study, a reduction in heart rate occurred in almost all subjects, being more pronounced in older patients with rapid heart rates. This effect is especially desirable in elderly persons in whom the coronary circulation is likely to be impaired.

Our study confirmed the hypotensive effect of Hydergine noted in previous studies (11, 32). The decrease in blood pressure occurred principally during the first half hour after injection. The most significant drop took place in older persons. The fall was greater in hypertensive subjects than in those with normal pressure. Our observations lasted only an hour, but the hypotensive effect of Hydergine is known to commence within five to ten minutes following injection, to reach a maximum at the first hour, and to recede in six to eight hours. The effect upon the peripheral circulation was demonstrated by Popkin (33), who found that 60 per cent of patients with peripheral vascular disease improved significantly through use of this drug.

Some improvement in the electrocardiogram was observed in more than 30

per cent of subjects with abnormal tracings. In 3 subjects, complete normalization of the pattern occurred. The benefit lasted several hours. This effect is the result of improved coronary circulation, primarily because of the bradycardia produced, and the better diastolic coronary filling with a concomitant fall in blood pressure in hypertensive patients. The final result is improved cardiac economy and an increase in coronary reserve, which indicate that the drug is suitable for the treatment of diseases associated with coronary sclerosis (24).

In a few instances, the amplitude of the R-wave increased significantly, probably because of improved myocardial efficiency. These findings contrast with those of Pöldre, who noted no electrocardiographic changes (11). The significant drop in blood pressure observed in some cases did not cause the electrocardiographic findings to deteriorate as might be expected in elderly persons with poor coronary circulation, and as has been observed with the use of most hypotensive agents. In a few cases, an effect on the vagus was shown by the characteristic S-T segment elevation.

A difference of opinion exists as to the most reliable method for making a ballistocardiogram. We based our observations on qualitative and quantitative changes in the pattern before and after the use of Hydergine. The majority of the subjects had abnormal tracings before the injection of Hydergine, the changes varying from grade II to grade IV according to Starr's classification. Approximately 30 per cent of those persons with an abnormal ballistocardiogram at the outset showed some improvement consisting of taller waves and a tendency toward more normal complexes.

Prior to medication no close relationship was observed constantly between the electrocardiogram and the ballistocardiogram. Thus, in 9 cases the electrocardiogram was normal, but the ballistocardiogram was abnormal. In a few other cases in which the electrocardiogram was slightly abnormal, the ballistocardiogram was extremely abnormal.

In most cases, improvement in the electrocardiogram was closely related to improvement in the ballistocardiogram following the injection of Hydergine. However, in 6 cases, improvement in the ballistocardiogram was not followed by improvement in the electrocardiogram. The reverse was true in 2 cases. The improvement observed probably resulted from greater efficiency of the myocardium and restoration of the circulation.

The lack of side-effects confirmed the low toxicity of Hydergine noted in other reports. This is a distinct advantage in the use of the drug in elderly people, particularly in those who are subject to acute hypertensive episodes. In these cases, the effects upon pulse rate and coronary and cerebral circulation are desirable.

SUMMARY

In 45 elderly persons, the effect of Hydergine upon the cardiovascular system was studied. In the majority, the heart rate was reduced following subcutaneous injection of the drug. Most of the reduction occurred during the first half hour

after injection. The average reduction was greater in persons with normal blood pressure than in those with hypertension. The blood pressure was reduced in all but one instance. This effect, too, was most noticeable during the first half hour. The fall in systolic pressure was more pronounced in hypertensive than in normal subjects, but the fall in diastolic pressure was not significantly different in the two groups. Some improvement in the electrocardiogram and in the ballistocardiogram occurred in approximately one-third of the subjects whose recordings showed abnormalities initially. No side-effects were noted during the use of the drug. It is concluded that Hydergine is a safe drug to use for lowering blood pressure. It simultaneously improves cardiac function and peripheral circulation.

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THE TREATMENT OF IRON DEFICIENCY IN THE AGED: A CONTROLLED STUDY

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Although the stores of iron in the human organism remain fairly constant throughout the most of life (1), the incidence of iron-deficiency anemia appears to rise appreciably during and after the seventh decade. Among factors that may account for this are hemorrhagenic conditions, changes in gastric activity affecting the absorption of iron, and alterations in dietary habits that follow dental and/or gustatory deterioration. The diagnosis of iron-deficiency anemia in geriatric patients is often difficult, since the common clinical symptoms of this disorder—easy fatigability, irritability and pallor—may be erroneously regarded as symptoms of "natural" decline. This is especially true if the patient has reduced his activity gradually over a period of several years (2). Although iron-deficiency anemia is generally correctable, therapy may be accompanied by inconvenience and side-effects to which the elderly patient is frequently less tolerant than is the younger one. If, for example, his ability to absorb iron has been reduced, large oral doses of iron may be of little benefit, and may produce gastro-intestinal disturbances; in such patients it is often necessary to administer iron parenterally.

Recently, several investigators have shown that, in non-geriatric patients, the absorption of conventional doses of iron (and of vitamin B_{12}, as well) is enhanced in the presence of D-sorbitol, a low-calorie sugar that is used as a sweetening agent and moisture stabilizer (3–6). To test the effectiveness of D-sorbitol as an absorption-enhancement agent in anemic geriatric patients, 2 otherwise identical hematinics, except for the presence of D-sorbitol in one, were administered to 2 groups of patients.

MATERIAL AND METHOD

Thirty-nine geriatric patients (16 men, 23 women) between 71 and 89 years of age were selected from private practice and from among the residents of a private home for the aged. Patients were included in the evaluation if they exhibited one or more clinical signs or symptoms of anemia (easy fatigability, weakness, anorexia or shortness of breath), and had hemoglobin and erythrocyte levels below the normal values suggested by Newman and Gitlow (7) (Fig. 1). Average pretreatment hemoglobin and erythrocyte values for the men were 19 per cent below normal. Approximately one-third of the patients had a history of illness (mainly respiratory and pyogenic infections) in the twelve months preceding the evaluation; another third had one or more chronic ailments, such as hypertension and arthritis. The daily dietary intake of iron appeared to be adequate for at least half the patients, particularly for those who were residents at the institution.

The patients were divided into 2 groups (Group A = 20 patients; Group B = 19 patients). Those in Group A were instructed to take 1 teaspoonful (5 cc.) of a preparation (Vi-Sorbin) containing 100 mg. of ferric pyrophosphate, 2 mg. of vitamin B_6, 8.33 μg. of vitamin B_{12}, and 3.7 Gm. of D-sorbitol, three times daily; those in Group B received the same treatment,

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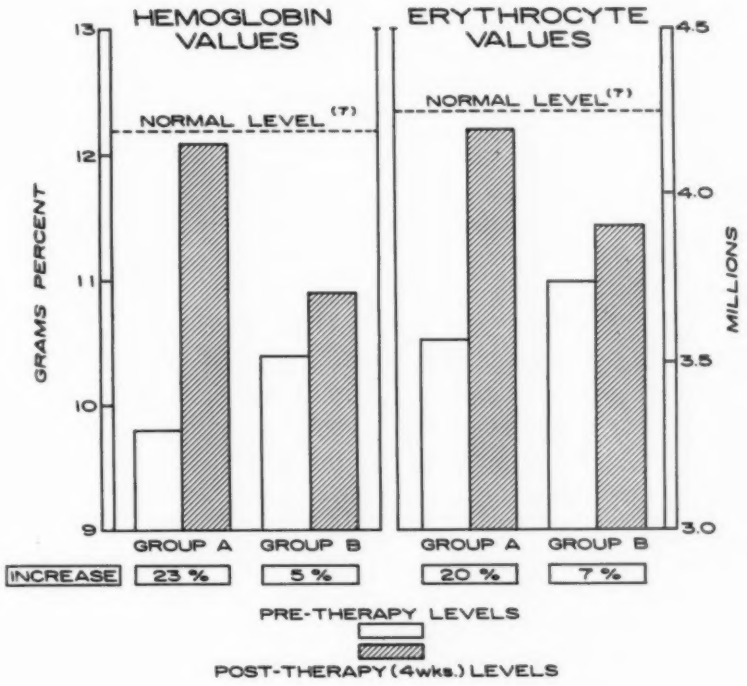

FIGURE 1

except that the preparation they received lacked D-sorbitol. Patients were paired, as closely as possible, according to sex, age, and subjective and objective symptoms of iron-deficiency anemia. Before treatment and at the end of four weeks of therapy, laboratory tests were made in order to determine the changes that had occurred in hemoglobin and erythrocyte values; in addition, information on changes in subjective symptoms was obtained by observation, interviews with the patients and, in the case of persons who were residents at the institution, by interviews with staff members who saw them daily.

At the completion of the trial period, the results of therapy in the two groups of patients were compared, chiefly on the basis of changes in hemoglobin and erythrocyte values, and secondarily on changes in clinical symptoms.

RESULTS

As can be seen from Figure 1 the percentage increase in average hemoglobin levels in the group receiving the preparation containing D-sorbitol was 4.6 times as great as that in the group receiving the preparation lacking D-sorbitol. The percentage increase in average erythrocyte counts was approximately 2.9 times as high in the former group as in the latter. In 19 patients (95 per cent) of Group A there was an increase in hemoglobin and erythrocyte values. In 15 patients (80 per cent) of Group B there was an increase in hemoglobin values, in 16 (84 per cent) there was an increase in the erythrocyte count, and in 2 (10 per cent) there was a slight decrease in hemoglobin and erythrocyte values during the trial period. Hemoglobin and erythrocyte values were unchanged in 1 patient in Group A. In Group B, hemoglobin values were unchanged in 3 patients, and erythrocyte counts in 2 patients.

TABLE 1

Sex	Blood Component	Group A (D-Sorbitol in Hematinic Agent) (11 women, 9 men)				Group B (No D-Sorbital in Hematinic Agent) (12 women, 7 men)			
		Pretreatment		After 4 weeks of therapy		Pretreatment		After 4 weeks of therapy	
		Unadjusted	Adjusted*	Unadjusted	Adjusted**	Unadjusted	Adjusted*	Unadjusted	Adjusted**
Men	Hemoglobin (Gm. %)	10.3	10.7	12.6	12.9†	11.1	10.7	11.7	11.4†
	Erythrocytes (per cu. mm.)	3,600,000	3,700,000	4,400,000	4,500,000‡	3,800,000	3,700,000	4,000,000	4,000,000‡
Women	Hemoglobin (Gm. %)	9.4	9.8	11.7	12.1‡	10.0	9.8	10.5	10.1‡
	Erythrocytes (per cu. mm.)	3,400,000	3,500,000	4,000,000	4,100,000†	3,600,000	3,500,000	3,900,000	3,800,000†

Common baseline = average of mean values for both groups.
* Based on common average.
** Post-treatment results adjusted to common baseline.
† Difference statistically significant ($P < .05$).
‡ Difference statistically significant ($P < .01$).

Since, in the treatment of iron-deficiency anemia, patients with lower hemoglobin and erythrocyte levels respond more rapidly than do patients with higher levels, it was necessary to determine whether this factor accounted for the better response achieved by Group A. Accordingly, the data were subjected to covariance analysis, which provided both groups with common pretreatment average hemoglobin and erythrocyte baselines. As can be seen from Table 1, all differences between the two groups were statistically significant, indicating that the presence of D-sorbitol chiefly accounted for the better response achieved by Group A.

Subjective data were, of necessity, less precise. On the basis of reports from the patients and/or members of their families, and from personnel at the institution, there was a noticeable improvement in appetite in approximately half the patients, and a possible improvement in another third. Also reported was an increase in physical activity, such as walking, visiting, interest in craft projects, housekeeping, and mending of clothing, in approximately a third of the patients. These improvements were shared about equally by the patients in both groups. It is probable, however, that the small added attentions given to these patients during the evaluation may have had a favorable effect on some of the clinical symptoms such as appetite and activity.

None of the patients in either group complained of gastro-intestinal disturbances or of other side-effects that could be attributed to the preparations used.

COMMENT

In light of the results obtained by other investigators (3–6), the data obtained in this evaluation suggest the conclusion that D-sorbitol enhances the absorption of iron in geriatric patients who have iron-deficiency anemias. Furthermore, the results obtained by patients in Group B would appear to indicate that the addition of an agent for enhancement of absorption is particularly desirable because of possible disturbances in gastric activity and absorption in many older patients. When gastric activity and absorption are unimpaired, as is the case when iron-deficiency anemia is caused by dietary inadequacy, the blood hemoglobin level will generally increase at the rate of approximately 1 per cent daily when adequate iron therapy is undertaken. In Group B, however, the average hemoglobin values rose only about .2 per cent daily, and in Group A approximately .8 per cent daily. Since the amount of elemental iron (36 mg.) was the same in the total daily dosage of both preparations, and was more than three times the daily dietary allowance recommended by the National Research Council, the low rate of increase in the average hemoglobin levels in Group B supports, in part, the premise that iron-deficiency anemia in older patients may be associated with disturbances in gastric activity and/or absorptive function.

It is not surprising that subjective symptoms may have responded more slowly and less clearly than did objective symptoms. It is important to recognize that familial, social and employment pressures to maintain or increase daily activity are less intense in geriatric than in non-geriatric patients. The older patient is retired; his habits tend to be conservative and self-protective, and he makes his transitions from inactive to active periods slowly and cau-

tiously. Nevertheless, the elimination of factors that create feelings of fatigue and weakness can help to maintain the older patient's interest and activity. It is important, therefore, that we differentiate inactivity due to irreversible pathologic conditions from inactivity due to conditions that can be corrected, such as iron-deficiency anemia. When iron-deficiency anemia exists, it is necessary to remove the underlying cause, if possible. If, however, the anemia appears to be caused by deterioration or chronic malfunction of one of the organs of the gastro-intestinal tract, or by dietary habits that resist change, therapy must be directed to improving iron metabolism. Because the correction of iron-deficiency anemia may result in greater interest and activity, timely diagnosis and treatment are not only important therapeutically, but also in the overall management of geriatric patients.

SUMMARY

Thirty-nine geriatric patients with objective and subjective symptoms of iron-deficiency anemia were paired for the evaluation of 2 hematinic preparations. The only difference between these preparations was that one of them contained D-sorbitol, an absorption-enhancement agent. After one month of therapy, the percentage increase in average hemoglobin levels was 4.6 times greater in the patients receiving the preparation containing D-sorbitol; the percentage increase in the average erythrocyte counts was 2.9 times greater. In both groups of patients there was significant improvement in appetite and activity.

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SALMONELLA TYPHIMURIUM SEPTICEMIA IN AN ELDERLY CARDIAC PATIENT: A CASE REPORT

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The finding of *Salmonella typhimurium* in a culture of blood from one of our elderly female patients served to remind us of the increasing frequency and importance of Salmonella infections in the general population, and more particularly in the older age groups (1-8). Salmonellosis in the United States has not been conquered. Although it is true that the incidence of typhoid fever is declining, infections with other members of the genus Salmonella are on the increase. *Salmonella typhimurium* is reported as most frequently implicated. In a study of salmonelloses in Massachusetts, MacCready *et al.* (5) reported that 983 of 2625 cultures (37 per cent) showed this organism. In Saphra and Winter's (6) series, *S. typhimurium* was recovered in 2385 of 7779 clinical and subclinical cases of salmonellosis. The classification of Salmonella bacilli is based on studies of their antigenic structures (O and H antigen), and correct identification is usually carried out by Centers organized for this purpose. In New York City, the Salmonella Center is at Beth Israel Hospital.

Salmonella are Gram-negative mobile bacilli which can be divided into 3 groups, according to pathogenicity:

1. Salmonella found only in man; this group include *S. typhi*, and *S. paratyphi*, A, B and C.
2. Salmonella found only in mammals (horses, monkeys, rodents) and birds (chickens, ducks, turkeys).
3. Salmonella found in mammals or birds and capable of causing disease in man. This is the largest and, from a public health point of view, the most important group; it includes *S. typhimurium*.

Salmonella typhimurium is a natural pathogen for rats and mice, in which it causes a disease known as mouse typhoid. The excreta of these infected animals is highly contagious. This organism is also pathogenic for man, and is the most frequent cause of outbreaks of Salmonella food poisoning and gastro-enteritis, not infrequently fatal. Weiss and associates (7) reported 4 cases of Salmonella pleuro-pulmonary disease, in 2 cases of which the agent was *S. typhimurium*. In many cases, the bacillus invades the blood stream and produce a septicemia with high fever, dehydration and circulatory collapse—a condition not unlike typhoid fever.

SALMONELLA INFECTIONS IN THE ELDERLY

The elderly are especially susceptible to Salmonella infections. Lack of proper sanitation and cleanliness increases the incidence. Because the incomes from

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pensions or relief agencies are so low, many old people in the larger cities live in substandard tenement houses, frequently over-run with rats and mice. Because of physical infirmities, such as blindness, severe arthritis, or residuae of strokes, many old people are physically unable to keep themselves or their rooms as clean as they should. Infections usually occur following ingestion of contaminated water, milk or food—contaminated by the excreta of rodents. Salmonella can grow in food, so that by the time it is ingested, the amount of infected material is rapidly pathogenic. *S. typhimurium* is one of the organisms most frequently found in acute gastro-enteritis of the epidemic type.

Once infected, how well do the geriatric patients fare in combatting Salmonella organisms? MacCready *et al.* (5) conducted a study of salmonellosis in Massachusetts. They found that 17 of 37 deaths occurred in patients 60 years of age or more, even though this older age group constituted only one tenth of the total series. Seven of these deaths were from infections with *S. typhimurium*. In Saphra and Winter's series (6), there were 318 deaths (4.1 per cent) among 7779 cases of clinical salmonellosis. In 99 of these 318 fatalities, death was due to *S. typhimurium*. The death rate by age groups was most interesting.

Age	Death Rate
In children less than 1 year old	5.8%
In patients from 1 to 50 years old	2.0%
In patients more than 50 years old	15.0%

The death rate in older patients was two and one half times greater than in infants, and at least seven times greater than in the young adult group. Saphra *et al.* also emphasized that, terminally, many older patients with cancer, diabetes, cardiovascular accidents, leukemia, or other debilitating diseases succumb to Salmonella infections.

The following is a case report of fatal *Salmonella typhimurium* septicemia in an elderly woman:

Patient A. L. (Hosp. No. 1645-57), a white female aged 67 years, was admitted during the night of March 14, 1957, via ambulance, for high intermittent fever, dry nonproductive cough, profound weakness and vertigo, of four days' duration. The patient stated that since December 1956 she had had a "virus infection" from which she had not entirely recovered. What treatment she received, if any, for the previous three months' illness was never determined. Because of her physical condition, she was unable to care properly for herself or her residence (an apartment in a substandard tenement house), which she confessed was over-run with mice and rats. No additional history was obtained.

On examination, the patient was an elderly white woman, under-nourished and definitely anemic in appearance, alert but not overly cooperative, acutely ill, and in slight respiratory distress. Examination by systems showed: Head—no evidence of cranial nerve abnormality; the pupils were equal and reacted to light and accommodation; the sclerae were mildly icteric. Neck—no nuchal rigidity and no adenopathy. Chest—symmetric, with good expansion bilaterally; no mammary masses or other pathologic conditions. Lungs—a few moist rales (which cleared on coughing) were heard over the left lower lobe posteriorly. Heart—cardiac sounds were of fair quality: the apex was percussed beyond the midclavicular line in the fifth intercostal space; there was regular sinus rhythm, and no

thrills or murmurs. The pulse was 90 per minute and the blood pressure, 130/80 mm. Hg. Abdomen—the liver, enlarged two fingers breadth below the costal margin, was smooth, and nontender. Spleen—palpable below the costal margin. Extremities—increased brown pigmentation of the skin over the lower left leg; no edema, cyanosis, or clubbing.

Laboratory findings revealed severe anemia with an erythrocyte count of 2,200,000 per cu.mm., hemoglobin 37 per cent, and a leukocyte count of 15,400 per cu.mm. (11 per cent stab cells, 78 per cent segmented cells, 10 per cent lymphocytes, and 1 per cent monocytes) (Table 1). The level of serum proteins was reduced and there was inversion of the albumin-globulin ratio. Urinalysis revealed slight albuminuria. Roentgenograms of the pulmonary fields demonstrated increased vascular markings and passive congestion. The cardiac silhouette was increased in its transverse diameter. The electrocardiogram showed a recent acute anterolateral myocardial infarct. In view of the unsanitary home conditions, Widal blood studies and blood cultures were ordered. The immediate concern, however, was over the patient's cardiac condition.

Course of disease: For the first week after admission, the fever ranged from 100° to 101°F., except for a one day's elevation to 103°F. On March 21, 1957, the Widal report (Table 2) listed high titers for paratyphoid and typhoid antigens. The next day blood cultures and stool cultures were reported to contain *Salmonella typhimurium* (Table 1). After antibiotic sensitivity tests, the patient was treated with 500 mg. of chloramphenicol (Chloromycetin) four times a day for two days, and thereafter with 250 mg. of Chloromycetin four times a day. From March 24 to April 14, the temperature ranged from 98° to 99.6°F. Widal blood reports on March 23 and April 4 showed little improvement. On April 11, 1957, a blood culture showed no *S. typhimurium*. Stool cultures, after the first one, never contained the

TABLE 1

Widal Reactions and Blood and Stool Cultures in Patient A. L.

	Widal Reactions					
	March 21	March 26	Apr. 4	Apr. 18	May 3	June 5
Paratyphoid A	Pos. 1-320	Pos. 1-320	Pos. 1-320	Pos. 1-320	Pos. 1-320	Pos. 1-160
Paratyphoid B	Pos. 1-320	Pos. 1-320	Pos. 1-320	Pos. 1-320	Pos. 1-320	Pos. 1-320
Typhoid O-Antigen	Pos. 1-1600	Pos. 1-1600	Pos. 1-3200	Pos. 1-800	Pos. 1-6400	Pos. 1-1600
Typhoid H-Antigen	Pos. 1-3200	Pos. 1-3200	Pos. 1-3200	Pos. 1-3200	Pos. 1-6400	Pos. 1-800
Brucella	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
Proteus X-19	Neg.	Neg.	Neg.	Neg.	Pos. >1-80	Neg.

	Cultures								
	March 22	Apr. 1	Apr. 8	Apr. 11	May 6	May 22	May 27	June 3	June 11
Blood cultures	Pos. for S.T.M.*	Pos. for S.T.M.		Neg. for S.T.M.		Pos. for S.T.M.		Pos. for S.T.M.	No growth
Stool cultures	Pos. for S.T.M.	Neg.	Neg.	Neg.	Neg.		Neg.		

* S.T.M. = *Salmonella typhimurium.*

TABLE 2

Hemograms in Patient A. L.

Date (1957)	RBC millions/ cu. mm.	WBC (per cu. mm.)	Hgb. (%)	Differential leukocyte count (%)				
				Eosin.	Stab	Seg'd.	Lymph.	Mono.
March								
15	2.2	15,900	37		11	78	10	1
19	2.4		53					
20		11,600		1	6	65	23	5
25	2.5	9,600		2	4	69	20	5
April								
2	3.08		59					
11	2.98	5,500	51			62	36	2
25	2.7	6,000	51		4	45	43	8
May								
3	2.7		49					
10	2.6	5,750	43		2	69	26	3
11		5,500			5	58	37	
18	2.0	9,500	39		1	83	14	2
29	2.4	7,550	51		4	55	40	1
June								
3	2.4	20,600	49		25	68	6	1
13	2.95	6,500	49		1	69	30	

bacillus. On April 14, after twenty-one days of continuous Chloromycetin therapy, all medication was discontinued. Within twenty-four hours, fever had returned to 104°F. and continued for two days to 102°F. Chloromycetin therapy was resumed and the temperature returned to normal. A combination of penicillin and dihydrostreptomycin (Combiotic) was given (2 cc. twice daily, intramuscularly) in addition. On April 30, 1957, two weeks later, Combiotic was discontinued but Chloromycetin was continued. Widal tests showed increased titers on two readings. As late as May 22, a blood culture was reported to contain *S. typhimurium*. At this time, Chloromycetin was discontinued, and a 300-mg. capsule containing equal parts of Aureomycin, Achromycin, and Chloromycetin was given four times daily. On June 3 another blood culture showed *S. typhimurium*. Treatment was continued until June 11, when at long last, a blood culture failed to show any growth of organisms. All antibiotics were discontinued at once. Except for an occasional rise of temperature to 100°F., the patient remained afebrile. The electrocardiogram showed healing in the infarct. The patient's condition continued to be poor, however. She showed no interest in food, or in her surroundings. In spite of transfusions, vitamins and other supportive measures, no improvement occurred. During the last two days of June, her condition deteriorated rapidly. Pulmonary edema set in, and the patient died on June 30, 1957, after a hospital stay of 106 days.

COMMENT

It is reasonable to assume that this patient's so-called virus infection in December 1956 may have been due to *Salmonella typhimurium*. The severe anemia and malnutrition secondary to the infection no doubt contributed to the development of the acute anterolateral myocardial infarct. Treatment in the hospital was disappointing, in that the various antibiotics administered failed to control the bacteremia until almost six months after the onset of the

original illness. It might be well at this time to repeat two therapeutic warnings in connection with Salmonella infections: 1) Do not use strong antibiotics such as Chloromycetin for the treatment of Salmonella gastro-enteritis or food poisoning, as such therapy may destroy the normal coliform bacilli which may be antibiotic themselves against Salmonella. Reserve the tetracyclines and chloramphenicols for cases of bacteremia and septicemia. 2) Use cortisone and other steroids with caution in elderly patients, as during cortisone therapy a mild Salmonella infection may become disseminated into the blood stream with disastrous results.

SUMMARY

The frequency and importance of Salmonella infections in the older age group is emphasized. A case of *Salmonella typhimurium* septicemia in an elderly female patient with an acute antero-lateral myocardial infarct is presented.

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THE PSYCHIATRIST'S ROLE IN A HOME FOR THE AGING

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The family, that sociological football, is again being kicked around. To the unrelenting criticism leveled against it for its poor job of child rearing, suspicion is being added from an entirely different quarter. Many people think that the family is not responding adequately to the challenge of what to do with and for aging grandpa and Aunt Lucy. They are quick to point out that the usual family is sadly wanting in its capacity to handle the old folks, although it does take care of the needs of children and of adults. Happily, however, the task of what to do with our aging citizens need not be only the family's. The very nature of growing old, the processes that this entails, and the end-results, make the elderly person so dependent upon others that responsibility for his care must be shared.

Those who tend to blame the family for our difficulties with the care of the aging confuse the dependency of the child with that of the aged. They feel that both should be cared for in identical fashion. Although to be sure, both are dependent, the movement and the direction of the dependency in the case of the infant is diametrically opposite to that of the oldster. The child is changing into a state of less and less dependency, with the assurance that he will mature in all areas of human endeavor. Those in contact with the child have reason to be hopeful. The aging person, on the other hand, is becoming more and more dependent. In the long run he will become *completely dependent*, at which time he will require continuous care in all pursuits. Those in contact with the aged person, therefore, must find hope, not alone in their relationship with him but, more importantly, in themselves and in their own beliefs. This absolute dependency of the aged, a factor always to be kept in mind but never allowed to deter us, suggests that agencies other than the already overburdened family are what is needed—agencies staffed by persons both dedicated and sensitive to the needs of the aging.

Whom can we count upon to care for the aging if the solving of this problem is beyond the family? We believe that the proper management of the elderly person centers about the "home for the aging."[1] The home for the aging is a new and dynamic concept, optimistic in its philosophy, holistic in its approach and modern in its operation. This residence is not to be confused with such stereotypes as "county poor house," "state hospital" and "old age home," all of which have outlived their usefulness and no longer meet the needs of the more mature community.

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[1] The institution being described as a "home for the aging" can be supported by the state, church, or by private endowment.

Briefly, a home for the aging is much more than a home away from home. It is a small community of aging persons who, although not pampered, are expertly cared for spiritually, physically and emotionally.[2] Physical and psychic rehabilitation is the keynote, rather than the once prevalent hopeless resigned inaction. A well trained and devoted staff plans and executes a program which identifies the uniqueness of each resident, supports his hidden creativity and recognizes his productivity.

THE TRADITIONAL MEDICAL ROLE

During the last two decades, and particularly since World War II, the physician has responded to the elderly person in characteristic ways. He has been able to conceptualize and categorize the disease processes brought on by senility. He has been able to provide support for the various body mechanisms and thereby prolong life. Moreover, he has been able to ease both physical pain and mental anguish. But the end-result of his relentless effort, immediately successful as it is, has been to make the problem of over-all geriatric[3] care much greater. Many more people live to greater age, critically hamstringing the family or overburdening the already inadequate and understaffed homes and hospitals for the aged. It is predicted that in just fifteen years 13 per cent of our population will be 65 years of age or older!

To add to this paradox, the physician's interest and concern about the oldster has backfired. This emphasis, although well intended, means to the elderly person as well as to those responsible for him that the process of growing old is *abnormal*. In many circles now, the last trimester of life is looked upon as a period of deterioration and not evolvement, of despair and not hope, and of meaningless dependency and not fruitful participation. This unfortunate state of affairs clouds conceptions concerning the elderly, which otherwise might be clear. For example, as a result of this confusion some homes become filled with chronically ill patients who should be in hospitals, while the healthy aged are without sufficient attention or programs. Another equally harmful situation arises when irritability, forgetfulness and mild confusion—signs only of a benign dotage in the older person—are misjudged, with the consequence that our state hospitals are filled with so-called "senile" patients. In this instance, the family, the local medical doctor and the home's resident physician are equally at fault. We cannot expect the older generation to be as efficient in interpersonal relationships or as clear in their perceptions as their children and grandchildren. But this does not mean that they are mentally ill. Far from it!

There is no question that medical care for the older citizen, as for all, should be the very best possible. Medical help, however, should not be so emphasized as to dominate the thinking of the community, the family and the resident house

[2] A home for the aging ideally has both day-care residents and "in-residents." The day-care residents participate fully in the program and eventually may become "in-residents."

[3] Geriatrics: the branch of medicine which deals with the health problems and the diseases of age. Gerontology: the science which deals with aging processes.

staff. Should this happen, many residents not only continue to feel very sorry for themselves, but some also manifest a morbid preoccupation with physical symptoms. When this is full blown, the resident is all but lost to the social and cultural activities which are the mainstay of the total residential program.

THE PSYCHIATRIST'S POSSIBLE CONTRIBUTION

Recently, the psychiatrist's multiple role as clinician, social planner, psychologist and philosopher has been questioned. However, in no area do these possible attributes hold him in better stead than in contributing to the staff work entailed in planning, opening and operating a home for the aging. The psychiatrist (there are far too few of them) can be a unifying force, bringing about harmony among widely diverse factors. These factors are the conflicting interests of the resident himself, his family, the community and the professional and nonprofessional staffs of the "home."

It would be a mistake to believe that only the psychiatrist can be this unifying force, and it would be an even greater error to assume that the psychiatrist, through the application of his psychotherapeutic or psychoanalytic skill *alone*, is miraculously able to bring about this essential cohesion. No, it is rather his deep interest in human affairs, his keen awareness of interpersonal dynamics, his constant concern with both adjustment and growth which enable him to be of value. These are characteristics that are to be found in all.

It is not generally realized, however, that the means, methods and goals of the psychotherapist are of a different order than those of the other medical specialties. Briefly, his means are *his own being*, his methods are those of communication, and his goals are those of personality change. With his patients, the psychotherapist attempts to face the paradoxes of life—living, knowing that one is dying. Cure for him is personality evolvement, aiding his patient to become somewhat stronger in a conflictual world. This difference in point of view between the psychotherapist-physician and the medical specialist may be crucial in the care of the aging. This approach to a psychiatric patient many times promotes in the psychiatrist a stamina for dealing with the elderly person that is matched by few and exceeded only by the devoted religious.

But is not this picture overdrawn? Perhaps it is, although it is not meant to idealize the psychiatrist. Rather, it is an attempt to illustrate certain qualities that might be found in each one who encounters the aging and who, in some measure, is responsible for his care.

The religious-philosophical point of view cannot be omitted in our planning for any phase in one's existence. In the last third of life, when the old person prepares in his own way for death, his religious beliefs and practices naturally are to be supported. It follows from this that each "home," regardless of its religious affiliation or even its secularity, should include on its staff some trained pastoral counselors for all the faiths represented by the residents.[4] Pastoral

[4] This would be similar to the arrangement in the state mental hospitals in New York, where each hospital has assigned to it a rabbi, a minister and a priest.

counseling could find its biggest and most difficult challenge among our old people.

IMPORTANCE OF THE NONPROFESSIONAL STAFF

We cannot think of care for the aging without visualizing that daily (and nightly) essential relationship between the so-called nonprofessional and his charges. In the give and take of a day's routine, an attendant, practical nurse, porter, elevator operator, janitor, or waitress (to mention but a few) performs a double function. First he sees to it that the resident is fed, clothed, toileted, washed, medicated and transported. Secondly, he supports and carries out the home's social and cultural program. A common fault in high-level discussions of geriatric care is the exclusion from the agenda of problems relating to the training, recruitment, selection and reward of these vitally important staff members. Current annual budgets for the operation of homes indicate fallacious reasoning, when relatively more money is allotted to the skilled person than to the nonskilled. As one administrator recently stated, "With the hardest human task to perform (to care for the totally dependent), we are allowed only the poorest kind of person."

It is hard to imagine in all of geriatrics a more important role than that played by the so-called nonskilled person. Without him, not even custodial care is possible; but with him, and especially if he is properly motivated, not only is care possible but also something less tangible but highly significant. He and his colleagues may be able to establish an atmosphere of hope and cheer and dispel much of the despair and drabness which pervade many homes today. The climate of the home may be suggested by the administrator. In the final analysis, however, it is dependent upon the good will, constancy, emotionality, thoughtfulness and attentiveness of the men and women who care for the resident.

The resident's spiritual, physical and psychologic well-being—the goal in all homes—or his over-all rehabilitation in these same areas—the goal of a few old and well-endowed centers—can be obtained only in a human setting of emotions and actions.[5] The home for the aging then becomes a field of forces made up of the interacting residents as they attempt to fullfill their needs, and the persons who continually care for them as they carry out the duties laid down in the complex program of the home. On closer examination, *this matrix of interaction within the home is significantly similar to that of the family, in that the essentials of love, affection and mutual respect abound in both.* Although it is true that a home for the aging is a home away from home, in many respects it is much more. Our objective and sympathetic approach, our greater understanding, and our greater skill would suggest that the properly conducted home for the aging offers a unique opportunity for the older person and also for his responsible relatives.

[5] The concept of rehabilitation of the aging has evolved at the Mary Manning Walsh Home in New York City. Residents have become more creative, are better off physically, and show heightened morale through participation in the over-all program.

OUTLINE OF THE DUTIES OF THE PSYCHIATRIST IN A HOME FOR THE AGING

Because there are relatively few psychiatrists, and because there are still fewer who are inclined to work with the aging, certain suggestions are in order. The American Medical Association,[6] the American Psychiatric Association,[7] and other similar organizations should have consultants in geriatric psychiatry who should support local old-age homes as they come into being. In addition, and immediately much more important, those organizations (state, church, and private group) whose responsibility it is to operate homes for the aging should have a psychiatric consultant on either a full-time or part-time basis. It would be his duty to fulfill as far as practicable the various tasks described in this paper. He would spend time as needed in working with the staffs of each home during the 3 developmental periods: 1) the planning phase, 2) the opening phase, and 3) the treatment and training phase. Naturally, what is stated here is not the whole answer. In the individual home the psychiatrist must lend himself to the unique problems which present themselves. Moreover, the 3 phases overlap and are considered here in this fashion only for the sake of clarity.

I. *The planning phase*

Definition: The period from the time of the first planning of the institution or conversion of an old facility, to the opening of a home for the aging.

Duration: Indefinite, based upon many contingencies.

The psychiatric consultant, in cooperation with the medical staff, gives expert advice on:

1. The physical layout in general, keeping in mind the morale of residents and staff.
2. The number of beds to be allotted to: *a*) the aging in general (size of the home), *b*) the healthy aging, *c*) the sick aging in the medical and surgical categories, and *d*) the sick aging in the psychiatric category.
3. Building construction which will offer maximum safety for the residents.
4. Other matters peculiar to the situation.

The psychiatric consultant also aids in:

1. Decisions concerning the professional and nonprofessional staffs.
2. The selection of the staff.
3. The psychiatric examination of the professional staff (brief and practical).
4. Psychiatric and philosophical orientation of the staff (medical, physical medical, social work, case work, social group work, occupational therapy, nonprofessional, and so forth).
5. Prior planning with regard to possible conflicts which may arise among the residents, staff, family and the community.
6. Other matters pertaining to the situation.

[6] Dr. Leo Bartemeier, Chairman of the A. M. A. Council on Mental Health and Dr. Richard Plunkett, Secretary of the Council on Mental Health.

[7] Dr. Ewald W. Busse, Chairman, The Committee on Aging, The American Psychiatric Association.

II. *The opening phase*

Definition: The period just before the opening of the new institution, and a somewhat later period when the "home" is operating in routine fashion.

Duration: Roughly, one year.

The psychiatric consultant, in cooperation with the medical staff, gives expert advice on:

1. The content of the preadmission physical examination (psychiatric portion).
2. The content of the admission physical examination (psychiatric portion).
3. The psychiatric fitness required for admission.
4. The psychiatric disabilities which require psychiatric hospitalization.[8]
5. The ways and means of managing the resident with severe physical or mental illness.
6. Other matters which might arise.

The psychiatric consultant aids in:

1. Psychiatric examination of certain residents: *a*) at the time of admission, and *b*) at the time of mental hospital disposition.
2. The efficient and nontraumatic disposition of residents with physical or psychiatric illness incurred during residency.
3. The selection of new staff.
4. The psychiatric examination of new staff (brief and practical).
5. The orientation and support of the staff.
6. The pastoral care of the residents, by supporting the chaplain's programs (particularly important in secular homes).

III. *The treatment and training phase*

(This refers mostly to large, well staffed and endowed residences which, through fortunate circumstances, can become teaching and research centers.)

Definition: The period after the home has been in routine operation for some time.

Duration: Indefinite and continuous. The entire period of operation—possibly beginning after the first year.

The psychiatric consultant, in cooperation with the medical staff, gives expert advice on:

1. All points suggested in the planning and opening phases.
2. The formulation of training programs for all categories of professionals engaged in caring for the aging: *a*) administrators, *b*) medical (physicians, nurses, practical nurses), *c*) psychiatrists, *d*) psychologists, *e*) social workers (medical, case, and group), *f*) physical medical technicians, *g*) recreationists, *h*) key nonprofessionals, and *i*) nonprofessionals.

[8] This matter will be covered more fully in another paper. Generally, mental hospitalization is requested only for those residents who endanger themselves, other residents, or the staff, or who in some way critically disrupt the program of the home.

3. The psychiatric treatment of residents and staff: *a*) physical, *b*) psychologic (individual), and *c*) psychologic (group).

The psychiatric consultant aids in:

1. All points suggested in the planning and opening phases.
2. In the training of all categories of personnel (see preceding lists): *a*) the in-staff of the home, and *b*) affiliated staffs of other homes.
3. In the psychiatric treatment of residents and staff: *a*) physical, *b*) psychologic (individual), and *c*) psychologic (group).

THE SHORTAGE OF PSYCHIATRISTS: IS IT NECESSARILY A DETERRENT TO OPERATION OF THE HOME?

The steps outlined in the previous paragraphs cannot be accomplished overnight. In the meantime, what of the small, 50 to 100-bed metropolitan home with a budget much too small to afford a psychiatrist, or the home in a remote community which does not boast of even a single psychiatrist? In these instances, can the psychiatrist's place be taken by another? What provision can be made to obtain help on perhaps a voluntary consultative basis, using an outside agency? How can the small, hard-pressed staff, both administrative and medical,[9] be made more sensitive to psychiatric problems and their proper handling when no psychiatrist is available?

These are some of the questions being answered by alert board chairmen, directors and administrators. Generally, those in charge use existing resources in order to solve the knotty psychiatric problems that are certain to arise. Take for instance the originality of the director of a 200-bed home, who asked a Neuropsychiatric Service of a nearby government hospital for help in determining an admission mental-fitness policy. Another administrator was able to fill the gap by asking the Department of Mental Hygiene of the state about the proper procedure for disposing of mentally ill residents. The state departments of mental hygiene are most anxious to cooperate with, and support the struggling homes for the aging. It is realized at both state and federal levels that the properly conducted home for the aging will decrease the numbers of mentally sick aged and thus lessen the numbers who will require definitive mental hospitalization.

All cities of any size, and most counties, are covered by a physician who is a public health expert. Although his training and duties are vastly different from those of a psychiatrist, in matters pertaining to the safeguarding of health, he knows no superior. Certainly his talents should be called upon by the hard-pressed administrator so that the home's old-age planning will dovetail with the general public health planning and the execution of the over-all health program.

In this connection, the entire medical service for the home for the aging, including the psychiatrist, might be a community enterprise. Aside from a full-time house physician in homes where the number of residents warrants it, there should be complete medical coverage with all specialties represented, on a voluntary basis. The home then would surely be a part of the larger community

[9] This would include physicians, psychologists, social workers, and so forth.

with all of the doctors participating, thus insuring continuity in both care and responsibility. There is no question that if, in addition, the participating physicians, their colleagues and their friends would use the home for their aging parents, relatives and friends, the care of the residents would improve immeasurably. We see no contraindications if the troubled director of a privately endowed home requests some technical assistance from the son or the daughter of an aging resident of the home. In large state-controlled homes with ample medical and specialist staffs, this probably would not be necessary.

The originality and leadership of directors of homes is again observed when they, together with their staffs, attend meetings, workshops and seminars devoted to the solving of the psychiatric problems of the aging. One such workshop held recently in New York City considered "the ways and means of serving disturbed residents in their institutions." Here the psychiatrists, faced with the numerous problems brought up by the workshop members, were able to influence policy and make valuable suggestions to the staffs of many homes for the aging. For instance, should the mentally-sick aged, the physically-sick aged, and the healthy aged be in the same institution or in different ones? Who should determine when a resident ought to be transferred to a mental hospital? Who is responsible for "in-home" training of personnel? What is the staff's relationship to the community and family of the residents? It is well to emphasize that the psychiatrist did not lead the group in these discussions. He participated in the give and take, and soon realized that he was learning as much as he was advising. Each home had a somewhat different approach to each problem, and therefore a contribution to problem-solving was made by each workshop participant. No one person knows the answers to all of these questions. It is only through mutual participation in workshops and round tables that some light will be cast upon them.

Recently some states, notably New York, have appointed a psychiatrist as a consultant in geriatrics.[10] This wise policy has opened a new resource for those charged with the responsibility for the care of the aging. Now, under one department, the many matters pertaining to the psychiatric aspects of the aged filter in, are compiled, conceptualized, and distributed to those seeking information.

CONCLUSIONS

Longevity is not without its consequences. New and hard-to-solve problems result when life expectancy is increased by only a few years. Difficult though these problems may be, the physician, the social scientist and the pastoral counselor (priest, minister or rabbi) in close communication with the elderly residents and the staff of the home, will solve them.

The psychiatrist has, as have all medical specialists, an important part to play in this old age problem. His role is somewhat different from that of his colleagues because a part of his endeavor is nonscientific, perhaps belonging to

[10] Dr. Alvin I. Goldfarb is Consultant on Services for the Aged, New York State Department of Mental Hygiene.

the realm of philosophy. As in all social problems dealing with the human equation, and particularly in this one, scientific "know-how" is not enough. Something more is required.

The challenge, then, is how best to *care* for the older members of our families in our communities. It is a problem that confronts all of us, and is so extensive that it touches upon all social agencies and institutions. To meet this challenge, information concerning the proper operation of a "home for the aging" must be made available to those who are interested. The small group, the seminar and the workshop are the best means for fruitful participation. Through our creative imagination, procedures should be developed which will permit the elderly person whose life is faltering, to be productive until the end. Lastly, a philosophy must gradually be evolved which concerns itself with the care of the aging, this being the responsibility of each one of us.

Abstracts of Current Literature

CUORE SENILE. SPUNTI MORFOLOGICI E FISIOPATOLOGICI SULLE ARTERIE CORONAIRE INTRAMURALI NELL'ETÀ AVANZATA (THE SENILE HEART. MORPHOLOGICAL AND PHYSIOPATHOLOGICAL CHARACTERISTICS OF THE INTRAMURAL CORONARY ARTERIES IN ADVANCED AGE).

Azzolini, G., and Barboni, F. *Gior. Gerontol.* **6:** 75, 1958; through Excerpta Med. (Gerontol. & Geriatrics) **2:** 64, 1959.

The arterial tree within the wall of the heart has been studied by intra-arterial injection of India ink, in a series of 20 selected cases of older persons who had been followed carefully (clinically and electrocardiographically). Significant variations of the caliber of the arteries, of their course, and of the anatomic features of their subdivisions have been observed. The tortuosity and differences in caliber often give the arterial tree the aspect of "a dried bush" or "an old tree." These changes were seen in the older persons in both groups, *i.e.*, in the first group, which included subjects with clinically manifest heart disease, and in the second group, which included subjects with evidence of cardiac involvement but without clinical manifestations. The changes were, however, less marked in the second group. The physiopathologic consequences of the morphologic changes in the arterial tree appear to be that, when a certain degree of visible alteration is reached, the coronarisclerotic heart insufficiency becomes irreversible, and manifest clinical and electrocardiographic signs and symptoms are present.

THERAPY OF SENILE MACULAR DEGENERATION.

Bierman, E. O. *Am. J. Ophthalmol.* **47:** 405 (March) 1959.

Heparin was administered intravenously in 100-mg. doses twice weekly for five to ten weeks to 13 patients with macular degeneration. Ten patients treated with vitamins and other supportive therapy served as a control group. One patient receiving heparin improved greatly, 2 showed major improvement, but 8 showed no change. The condition became worse in 2 patients. Altogether the results were not substantially better than those in the control group. Heparin caused no serious hemorrhages and side-effects were minimal. In senile macular degeneration, psychiatric aspects are important and the value of reassurance of the patient may exceed that of medication. Therefore, the plan followed is to use supportive treatment with vitamins and occasionally nicotinic acid and to assure the patient that blindness, barring accidents, will not occur because of the disease. The use of heparin is reserved until it can improve a patient's attitude and possibly his ocular condition as well, and for desperate cases as a last resort.

ACTION OF NITROGLYCERIN ON THE CORONARY CIRCULATION IN NORMAL AND IN MILD CARDIAC SUBJECTS.

Brachfeld, N.; Bozer, J., and Gorlin, R. *Circulation* **19:** 697 (May) 1959.

In 10 normal or mild cardiac cases, observations of coronary and systemic circulatory dynamics and myocardial gaseous metabolism were made before and after the administration of nitroglycerin. Following nitroglycerin, myocardial oxygen consumption increased. Presumably related to this increased oxygen demand, coronary flow increased, mediated by a lowered coronary vascular resistance. The increase in myocardial metabolism was associated with unchanged cardiac work and a fall in myocardial efficiency. These changes were considered consistent with *in vitro* observations of increased oxygen consumption

induced by nitrites during oxidative phosphorylation. In these patients, cardiac output was essentially unchanged, while blood pressure decreased minimally. There were, however, significant decreases in pulmonary artery, pulmonary wedge and right atrial pressures, suggesting a relaxation of venomotor tone. (From authors' summary.)

FLARE-UP OF PERICARDITIS COMPLICATING MYOCARDIAL INFARCTION AFTER TWO YEARS OF STEROID THERAPY.

Dressler, W. *Am. Heart J.* **57:** 501 (Apr.) 1959.

In a 58-year-old man an unusual sequence of events followed acute myocardial infarction. The initial febrile period was prolonged and characterized by pleuropericardial pain and hemorrhagic expectoration thought to be caused by pulmonary infarction. However, fever and chest pain of pleuropericardial type continued relapsing for eight weeks, although hemorrhagic sputum was no longer present. The electrocardiogram showed no signs of an extending myocardial lesion. Because of the possibility that recurrent pneumonia was present, antibiotics were given but they did not alter the febrile course. After eight weeks, when chest films showed enlargement of the heart as well as pleurisy, a myocardial infarction syndrome was diagnosed. Therapy with Meticorten relieved all manifestations of this illness, but any attempt to withdraw this steroid was followed by flare-ups of fever and chest pain. At ten months and two years, respectively, after the onset of steroid therapy, its discontinuation produced symptoms and signs of pericardial effusion, pleuritis and pneumonitis. Some patients with myocardial infarction syndrome require no steroids; because some of the cases will subside spontaneously, hormones should be reserved for severe cases with a prolonged course and intractable pain. The observations in this case refute the view that the postmyocardial infarction syndrome is infectious in origin. Sensitization by necrotic heart muscle may be the cause of the inflammatory condition which occasionally complicates acute myocardial infarction.

METICORTEN AS ADJUVANT THERAPY IN CHRONIC PULMONARY TUBERCULOSIS WITH EMPHYSEMA.

Epstein, I. G.; Bornstein, P. K.; Nair, K. G. S., and Carpio, B. *Dis. of Chest.* **35:** 509 (May) 1959.

Controversy continues as to the value of prednisone in tuberculosis. Many studies have dealt with other forms of tuberculosis, but few have attempted to determine the value of prednisone used in combination with antimicrobial agents in patients with chronic active pulmonary tuberculosis with emphysema, which was the purpose of this investigation. Of 44 patients with chronic pulmonary tuberculosis and pulmonary emphysema, so-called "good chronics," in whom two years of chemotherapy had produced no clinical or roentgenographic improvement, 22 received 20 mg. of prednisone daily in addition to antituberculosis drugs. These were used according to tolerance and included streptomycin, isonicotinic acid hydrazide, aminosalicylic acid, cycloserine, and viomycin. Twenty-two control patients received these agents without prednisone. The mean duration of treatment was 5.5 and 6 months in the two groups, respectively. Among patients receiving prednisone, 8 improved, 10 remained unchanged, and 4 grew worse. Thirteen patients gained an average of 10 pounds in body weight, and 9 patients lost an average of 6 pounds. Among control patients, only 4 improved. Weight gains were less and weight losses greater in this group. The sputa in 2 patients in the prednisone-treated group became free of tubercle bacilli after twenty-four weeks, and in 3 others no tubercle bacilli could be seen on direct microscopy. The sputa in 2 control patients became bacilli-free, but the remainder were unchanged. Roentgenographically, improvement could be seen in 5 patients at six months, but none in 14 others. In 2 patients fresh exudative lesions had developed, but these cleared

when steroid therapy was continued. One patient was seen to have a progressively enlarging cavity which persisted despite treatment. No improvement could be detected on any of the films for control patients. Ventilatory function studies showed moderate to marked improvement in patients receiving prednisone, and these changes exceeded any seen in control patients. Unexpectedly, all prednisone-treated patients were free of hemoptysis. Nine control patients had varying bouts of hemoptysis. The principal side-effects of prednisone were the aggravation of diabetes in 2 patients, relative hyperglycemia in 3 patients, transient glycosuria in 1 patient, cardiac decompensation in 4 patients, and leukocytosis in 18 patients. The discussion of steroid therapy in tuberculosis from the point of view of pathologic physiology considers the stimulation of metabolic activity of resting forms of bacilli by steroids, their ability to reduce fibroblastic activity, and their ability to counteract allergic manifestations at the cellular level.

NEUROLOGICAL AND RADIOLOGICAL MANIFESTATIONS ASSOCIATED WITH SPONDYLOSIS OF THE CERVICAL AND LUMBAR SPINE.

Epstein, J. A., and Epstein, B. S. *Bull. New York Acad. Med.* **35:** 370 (June) 1959.

In spondylosis, injury to the spinal cord and nerve roots is caused by excessive narrowing of the vertebral canal and intervertebral foramina. Circulatory insufficiency may play a contributory role. Trauma is poorly tolerated by these patients and may cause abrupt neurologic changes. Symptoms are progressive in nature and may be confused with degenerative disease of the spinal cord, especially multiple sclerosis and amyotrophic lateral sclerosis. A tumor of the spinal cord and herniated disc may produce symptoms difficult to distinguish even by means of myelography. Co-existence of primary neurologic disease with spondylosis is now recognized as a serious diagnostic problem. In the cervical region there is early involvement of the spinal cord with the development of awkwardness of gait, spasticity and frank ataxia in the lower extremities. Numbness of the hands, atrophy, and loss of fine coordinated finger movements usually follow. Signs may eventually spread to involve all four extremities. Pain is not a conspicuous feature and may be entirely absent. Reflexes are depressed in the upper limbs, hyperactive in the lower extremities and at the wrist levels, with depression of position and vibratory sense of variable degree. Pain and touch may be less involved, sensory levels being poorly defined. Babinski signs are frequently found. Sphincter alterations are rare. In the lower spine, pain is a conspicuous feature, involving the lower back and spreading down one or both extremities in a radicular pattern. In advanced cases, sphincter function may be seriously compromised—a grave prognostic sign. Mobility of the back is restricted, and reflexes are depressed or absent; sensory changes may involve multiple dermatomes. Weakness and atrophy may be profound. Conservative treatment may provide temporary relief by means of immobilization and traction. With an advancing neurologic deficit despite such measures, decompression by means of laminectomy and foramenotomy, with removal of osteophytes and ridges anterior and lateral to the canal when possible, may provide some degree of improvement in 50 to 70 per cent of patients. Congenital narrowing of the canal in the lumbar region appears to be a definite clinical entity. In this group of patients, minimal protrusion of disc tissue or spur formation in the ventral quadrants of the spinal canal results in painful and disabling compression of the nerve roots. Decompressive laminectomy is the treatment of choice. (From authors' summary.)

PULMONARY DISEASE AND ARTHRITIS: REPORT OF TWO CASES.

Fernandez-Herlihy, L. *Lahey Clin. Bull.* **11:** 86 (Jan.–March) 1959.

In every patient with clinical signs and symptoms resembling rheumatoid arthritis, a search should be made for an underlying curable disease, since in many instances one may

be found. Two cases of hypertrophic pulmonary osteoarthropathy resembling rheumatoid arthritis illustrate this point. Articular symptoms and signs disappeared from the first patient after a pleural effusion has been removed. This is the course of events in hypertrophic osteoarthropathy when the primary lesion is removed. In the second patient the pulmonary lesion, a soft-tissue mass in the left upper lung field was inoperable, so that the articular symptoms could only be palliated. This was accomplished with 15 mg. of prednisone daily. Clubbing of the fingers and toes (as seen in hypertrophic osteoarthropathy) persisted. Results of the latex fixation test became positive during the course of the illness.

ANTEMORTEM DIAGNOSIS OF METASTATIC SARCOMA TO THE HEART: A CASE REPORT.
Frohlich, E. D.; Shnider, B. I., and Leonard, J. L. *Am. Heart J.* **57:** 623 (Apr.) 1959.

The clinical diagnosis of metastatic neoplasms to the heart is rarely accomplished. Metastatic involvement should be considered when a patient with a known malignant condition has persistent refractory congestive heart failure, persistent pericarditis manifested by persistent friction rub and pericardial effusion or both, signs of constrictive pericarditis, or cardiac arrhythmias. The case is presented of a 57-year-old female patient with suspected primary sarcoma of the pelvis, in whom cardiac metastasis was diagnosed ante mortem. Necropsy revealed a fibrosarcoma of the pelvis. Among the metastatic nodules one encompassed and constricted the descending branch of the left coronary artery so that the electrocardiogram showed evidence of myocardial infarction. Metastasis to the heart occurs either by the blood stream as an embolic phenomenon, by the lymphatics, or by direct extension. The right side of the heart is involved more frequently. The lesion is usually a discrete nodule that resembles metastasis elsewhere in the body. The nodule may become large enough to encroach upon ventricular chambers and thus produce heart failure. It may constrict a vessel and produce the signs and symptoms and electrocardiographic evidence of myocardial infarction. If the nodule interferes with the conducting system of the heart, cardiac arrhythmias will occur, the most common being auricular fibrillation and auricular flutter. Atrioventricular block of any degree may develop. The patient may die suddenly. The progressive congestive heart failure produced by the metastasis may be manifested by ventricular gallop and left and right heart failure. The electrocardiogram may show nonspecific T-wave abnormalities, evidence of pericarditis, low voltage, or arrhythmias. Lesions in the pericardium may produce pericarditis with a bloody pericardial effusion large enough to cause cardiac tamponade. When venous disease develops as a complication in a case of malignancy, the use of anticoagulants is contraindicated in the presence of a friction rub and evidence of pericardial effusion. In this instance the correct diagnosis of metastasis to the heart is important. Rarely is the endocardium involved.

PLASMA CATECHOL AMINE CONCENTRATIONS IN MYOCARDIAL INFARCTION AND ANGINA PECTORIS.
Gazes, P. C.; Richardson, J. A., and Woods, E. F. *Circulation* **19:** 657 (May) 1959.

Norepinephrine plasma levels were significantly increased in 13 cases of myocardial infarction and in 7 of these there was also a significant increase of epinephrine as compared to 7 normal subjects. There were no comparable increments of the amines in 6 patients with noncardiac types of pain. In myocardial infarction there was a positive correlation of norepinephrine and transaminase levels, but there was no such relationship with epinephrine and transaminase. In 12 cases of angina pectoris, norepinephrine increased in 8 cases after exercise, whereas epinephrine increased in only 5. There was no significant change

with exercise in the 7 normal subjects. It is believed that these increases in the levels of plasma catechol amines in patients with myocardial infarction and angina pectoris may play a significant part in therapy and prognosis. (From authors' summary.)

EFFECT OF NITROGLYCERIN ON THE CORONARY CIRCULATION IN PATIENTS WITH CORONARY ARTERY DISEASE OR INCREASED LEFT VENTRICULAR WORK.

Gorlin, R.; Brachfeld, N.; MacLeod, C., and Bopp, P. *Circulation* **19:** 705 (May) 1959.

In 17 patients, 7 with coronary artery disease and 10 with increased left ventricular work load, observations of coronary, pulmonary and systemic circulatory dynamics and myocardial gaseous metabolism were made before and after the sublingual administration of nitroglycerin. Fourteen of the 17 patients had angina pectoris. Nitroglycerin resulted in a decrease in cardiac output, blood pressure and left ventricular work in both "coronary" and "work" groups, and a fall in systemic and pulmonary venous pressures. Coronary blood flow and myocardial oxygen consumption were slightly increased at rest, with a slightly decreased myocardial efficiency as compared to normal. Coronary vascular resistance was normal. Following nitroglycerin, coronary vascular resistance remained essentially fixed; coronary flow and oxygen consumption were unchanged or actually decreased; and efficiency fell. These findings are believed related to prior exhaustion of the available vasodilator capacity of the heart, either by intrinsic coronary arterial obstruction or through hemodynamic overloading of the left ventricle by disease. The difference in reactivity between the normal and diseased coronary circulations is believed to afford an objective physiologic method of assessing the functional adequacy of the coronary circulation. (From authors' summary.)

THE USE OF STEROIDS IN TUBERCULOUS PATIENTS WITH UNTOWARD REACTIONS TO ANTIMICROBIAL THERAPY.

Grossman, R. *Dis. of Chest* **35:** 615 (June) 1959.

Five case reports are given of active pulmonary tuberculosis with coexistent untoward drug reactions to one or more antituberculosis agents. The patients were treated with combined steroidal and antimicrobial therapy. Following baseline studies of the drug reaction and the extent of the pulmonary tuberculosis, as well as estimates of liver and kidney function and of peripheral blood status, chemotherapy was discontinued. Initially, a dose of 80 to 120 units of ACTH-gel was administered intramuscularly and then, if necessary, prednisolone was given in a dosage of 10 to 15 mg. three times daily. Antihistamines orally or parenterally, or both, and hydrocortisone ointment were used as supplements, as required. Following three days of this regimen, antituberculosis agents were introduced singly and in progressively increasing doses. When one had been given successfully, a second was started, and then a third, as needed. When the patient could tolerate these drugs, the steroids were reduced gradually over a period of three to five weeks. Therapy of the underlying disease was judged by periodic sputum examinations and roentgenograms of the chest. During this treatment the drug reactions (pruritic rash, angioedema, fever, hepatitis) and disease toxicity (cough, expectoration, anorexia, fever and malaise) disappeared. Tuberculous exudative and recent infiltrative lesions regressed. In one case, a giant antrum could not be visualized roentgenographically following steroid medication. Positive sputum cultures in 2 patients were converted to negative. In the other 3 cases, the cultures remained negative during observation for twenty-one to twenty-six months. No adverse effect on the pulmonary tuberculous disease was noted as a result of steroid therapy. Undesirable effects of steroid therapy were of minor significance. Slight sodium and water retention in 2 patients could be controlled by the use of a low-sodium diet and the administration of potassium. In 2 patients with a history of peptic ulcer, no reactivation occurred.

EMERGENCY AND ELECTIVE SURGICAL TREATMENT OF ABDOMINAL ANEURYSMS. A COMPARATIVE STUDY.

Gwathmey, O.; Adkins, P. C., and Blades, B. *Postgrad. Med.* **25:** 677 (June) 1959.

Patients aged 50 years and over who have moderate to severe hypertension are candidates for an abdominal aneurysm and should be examined for an expansile mass. Evidence is cited that the incidence of abdominal aneurysms is increasing. The majority are the result of arteriosclerosis. The most frequent cause of death in abdominal aneurysm is rupture. Experience with 32 cases of abdominal aneurysm, half of which were of the emergency type, showed that elective excision is the treatment of choice and that good results may be expected. Among the 16 patients in this series undergoing the elective procedure, the operative mortality was 12.5 per cent. The prognosis is grave when an abdominal aneurysm has perforated, but operation is warranted and offers the only means of preventing death by exsanguination. The elective procedure should be performed unless there is some definite contraindication. Age should not be considered to contraindicate surgery. In this elective group, the patients were aged 47 to 68 years, and in the emergency group they were aged 54 to 84 years. In the emergency group, the salvage rate was 18.7 per cent. This was considered good in view of the hopeless situation of the patients, some of whom had been in a state of shock for five or six days prior to the attempt to excise the aneurysm. Two patients who survived were over 70 years of age and each had arteriosclerosis. Not only is there a latent period between the first symptom of imminent rupture of an aneurysm and the actual rupture, but the patient is likely to survive the actual hemorrhage long enough for surgery to be performed. There should, therefore, be no delay in sending a patient to the hospital after rupture of an abdominal aneurysm is suspected.

CLINICAL EXPERIENCE WITH CHLOROTHIAZIDE IN THE TREATMENT OF CONGESTIVE HEART FAILURE.

Harvey, S. D., and DeGraff, A. C. *New York J. Med.* **59:** 1768 (May 1) 1959.

Cholorothiazide was given in a daily dosage of 1.0 to 1.5 Gm. to 16 patients with chronic congestive heart failure after maximum diuresis had been obtained by a regimen of bed rest, low-salt diet, maximum digitalization, and parenterally administered mercurials. The maximum duration in any one patient was twenty-seven days; for the group, the total was 295 patient-treatment days. The response to chlorothiazide was greater than that to mercurials in 7 patients, and was the same in 4 patients. In 6 patients, an additional diuresis of 6 to 22 pounds was achieved. Five patients who were responsive to mercurials failed to respond to chlorothiazide. No patient who failed to respond to mercurials responded to chlorothiazide. The effect of chlorothiazide was profound. It produced "dry weight" in some of the patients. The response to chlorothiazide could not be predicted from the prior response to mercurials. Three patients were permitted to regain their initial weight before the first course of chlorothiazide had been given. During a second trial thereafter, the weight loss was the same in 1 patient but less in the other 2. In one of them, mercurials achieved a 4-pound diuresis. The rapid and profound diuresis in 3 patients receiving chlorothiazide resulted in the occurrence of hypokaliemia and the need for the administration of a potassium supplement. There were no signs of toxicity relative to the blood, kidney, or liver. It is concluded that chlorothiazide is a safe oral diuretic worthy of trial even in extreme circumstances.

METABOLIC AND CLINICAL EFFECTS OF TRIAMCINOLONE: BRIEF INTENSIVE TREATMENT IN GERIATRIC PATIENTS.

Hollister, L. E., and Glazener, F. S. *Antibiotic Med.* **6:** 331 (June) 1959.

Triamicinolone was administered to 20 elderly men without serious illness in a daily dosage of 32 mg. for twenty-one days, followed consecutively by 16, 8 and 4 mg. per day

for seven days at each level. The results of biochemical, hematologic and clinical observations during this intensive therapy were as follows: The concentration of total serum proteins was significantly reduced, due largely to a decreased gamma globulin fraction as measured chemically and electrophoretically. A neutrophilic leukocytosis and absolute eosinopenia also were observed. No significant changes occurred in the concentrations of serum cholesterol, esterified cholesterol, phospholipids, total lipids, and alpha and beta lipoproteins nor in blood creatinine, sodium or potassium. The fasting blood glucose level was not changed, and pre-meal glycosuria was not observed. The electrophoretic migration of serum glycoprotein fractions was not altered. Qualitative tests for urinary calcium excretion suggested an increase during treatment. Qualitative tests for secretion of gastric acid suggested stimulation in some patients. Blood pressure was little affected. Weight was greatly reduced in all patients. The complications of triamcinolone therapy comprised multiple pulmonary emboli in 1 patient, perforated duodenal ulcer and staphylococcal infection of the skin in 2 patients, and exacerbation of a mental disturbance in 2 patients.

TREATMENT OF SOME SENILE RETINOPATHIES WITH TRYPSIN.

Klíma, M., and Sverák, J. Paper presented at the 18th Internat. Congr. Ophthalmology, Brussels, 1958; through Excerpta Med. (Gerontol. & Geriatrics) **2:** 41 (Jan.) 1959.

Trypsin in intravenous drip was administered in cases of obstruction of the central retinal vein and in senile degenerations of the posterior pole. In venous obstruction the effect of trypsin surpassed that of anticoagulants. In senile macular degeneration and in senile macular pseudotumors, the dissolution of retinal patches and of subretinal exudate was observed, accompanied by substantial functional improvement. The mode of action of trypsin is discussed. Judging from laboratory experiments, it can be supposed that parenteral trypsin enchances production of the tissue trypsin inhibitor which, by checking proteolysis, helps in resorption of edema and in restoration of better circulatory conditions.

POLYCYTHEMIA AND HYDRONEPHROSIS OR RENAL TUMORS.

Lawrence, J. H., and Donald, W. G. *Ann. Int. Med.* **50:** 959 (Apr.) 1959.

A review of reports in the literature of the simultaneous occurrence of polycythemia and hypernephroma as well as other renal lesions is presented. Two additional cases of polycythemia with hypernephroma and 2 cases of polycythemia with unilateral hydronephrosis, one with a fibromyxosarcoma, are reported. (The association of polycythemia with hydronephrosis has not previously been reported.) Recent experimental work which indicates that there is a humoral erythropoietic factor, possibly produced by the kidney, is reviewed. The occurrence of polycythemia with hypernephroma and other renal lesions, and particularly the maintained correction of polycythemia following nephrectomy in several cases, seems to lend clinical support to the assumption that the kidney may be a possible source of, or essential to the activation of, a humoral erythropoietic factor, but the method by which this operates is not clear. (From authors' summary.)

THE EFFECT OF GANGLIONIC BLOCKADE ON VENOUS PRESSURE AND BLOOD VOLUME: FURTHER EVIDENCE IN FAVOR OF INCREASED VENOMOTOR TONE IN CONGESTIVE HEART FAILURE.

Lewis, D. H.; Cardenas, M., and Sandberg, H. *Am. Heart J.* **57:** 897 (June) 1959.

The effect of ganglionic blockade on venous pressure and on circulating blood volume was studied in 40 patients; 20 were normal and 20 had congestive heart failure. Half of the patients in each group were given hexamethonium and the other half not. In congestive heart failure, ganglionic blockade is associated with a drop in venous pressure but no

change in circulating blood volume. Venous pressure in congestive heart failure is not strictly dependent on the level of circulating blood volume. This is interpreted as further evidence in favor of increased venomotor tone as the important factor in the genesis of venous hypertension in congestive heart failure. (From authors' summary.)

CLINICAL PHARMACOLOGY OF FLUMETHIAZIDE, A DIURETIC AGENT.

Montero, A. C.; Rochelle, J. B., III, and Ford, R. V. *Am. Heart J.* **57:** 484 (Apr.) 1959.

Flumethiazide caused a slight increase in the excretion of sodium at even the smallest dose tried, but the significant part of the dose-response curve lay between 1 and 2 Gm. Comparing these two doses, there was found a significant increase in the volume of urine and urinary sodium, and a decrease in weight as compared with the values in the control period when the larger dose was given. The dose-response curves for meralluride and flumethiazide are parallel and linear. At the dosage levels under observation, flumethiazide was found to be 70 per cent as potent as meralluride. The pattern of excretion of electrolytes after giving 1 Gm. of flumethiazide appeared to be almost identical with that observed following the administration of chlorothiazide. Diuresis commenced within two hours. The greatest increases in rates of excretion were observed for sodium and chloride which showed a three- to fivefold change. The excretion of potassium and bicarbonate increased, but in approximately physiologic proportions. Continuing excretion of sodium occurred following daily use of flumethiazide, until the body stores were depleted. The drug therefore is repetitively effective. A minimal rise in the level of blood urea nitrogen was seen and there was a slight tendency to elevation of the CO_2 combining power. These data suggest that the drug is potentially of value as a diuretic and as an adjunct in the therapy of hypertension.

MASSIVE GASTRIC HAEMORRHAGE IN PATIENTS OVER THE AGE OF 70 YEARS.

Nissen, R. *Deutsche med. Wchnschr.* **84:** 366, 1959; through German M. Monthly **4:** 75 (March) 1959.

Despite age and weakness caused by loss of blood, major gastric operations may be attempted in persons past 70 years of age. The procedure, however, should be the smallest that will stop bleeding. A definite indication for laparotomy must exist, that is, the patient must have persistent, severe hemorrhage or massive hemorrhage recurring at short intervals. The diagnosis must be established before operation in order to avoid exploring the entire gastro-intestinal tract, which is likely to be detrimental. Even in the case of continuous hemorrhage, a barium meal is not prohibited but it must be used without compressing the stomach or duodenum. Other requisites are preoperative emptying of the stomach, gastrostomy to remove blood clot from the stomach not removed by aspiration, the use of adequate anesthesia, rapid performance of the operation, and careful intravenous blood replacement. For benign tumor, a gastrostomy is performed, the tumor pulled through it, and the tumor excised from the inside. The defect in the stomach wall is closed from inside and a second invaginating suture placed on the outside. For carcinoma, the procedure is wide resection, the Billroth I technic being preferred for carcinoma in the antrum or body of the stomach. The resection is extended to include the epicardial segment of the esophagus when there is carcinoma of the fundus or the juxta-esophageal part of the lesser curvature. The operation is concluded by performing an esophago-jejunostomy, implanting the antrum into the afferent jejunal loop, and performing Braun's anastomosis. In carcinoma of the upper part of the stomach, preserving a small rest of the fundus and anastomosing the fundus with a coil of small intestine are dangerous procedures. For a penetrating gastric ulcer, local excision is performed with closure similar to that for a benign tumor. When gastric acidity must be reduced (which is rarely necessary in elderly persons), sub-

diaphragmatic vagotomy and gastroenterostomy are carried out. For an ulcer near the pylorus or in the duodenum, a sleeve resection restricted to the site of the ulcer is best. After the ends are closed, gastro-enterostomy and vagotomy are performed. A palliative operation—tying the vessels that lead toward the ulcer—is not a successful procedure. Hemorrhage from the fundus or from esophageal varices is rare in patients past age 70. The procedure to use in this instance in patients without hepatic coma may be laparotomy with splenectomy and transperitoneal ligation of veins leading to the lower esophagus, followed by high transverse division of stomach, gastro-hepatic and gastro-splenic ligaments. The two stomach ends are re-anastomosed without resection of a part of the stomach. Hemorrhagic gastritis also is rare in elderly persons. When it necessitates surgery, a two-thirds partial gastrectomy may be performed. The procedures listed were used in 25 patients (17 in the eighth decade and 8 in the ninth decade of life) with massive bleeding, the causes for which were carcinoma, benign tumor, chronic ulcer, or hemorrhagic gastritis. All except 4 operations were successful. One patient died because of a leaking suture and peritonitis. One patient who died of pneumonia postoperatively had a small encapsulated leak of the esophago-jejunostomy. Two patients who underwent palliative operations for carcinoma later died of metastases.

BASILAR ARTERY INSUFFICIENCY.

Poser, C. M., and Jordan, R. A. *M. Times* **87:** 293 (March) 1959.

The syndrome of intermittent insufficiency of the basilar arterial system is characterized by episodic attacks of transient neurologic signs and symptoms suggesting disease of the brain stem. These may be any combination of the following: transient ocular symptoms, such as homonymous defects of the visual field, dimness of vision, diplopia or ptosis; temporary mental confusion, clouding or loss of consciousness or vague personality changes; attacks of true vertigo; transient disturbances of speech (dysarthria, slurred or thick speech); dysphagia; episodes of headache and vomiting; transient hemiparesis; and transient sensory phenomena, especially involving the face, but occasionally involving the entire half of the body. The diagnosis should be considered especially when any of the symptoms occur on different sides of the body during different attacks. The most common are vertigo, diplopia, and alterations in the state of consciousness ranging from mild confusion or drowsiness to semicoma. Most important in diagnosis, since it must often be made from the history alone, is the knowledge that these attacks may occur for periods of fifteen to thirty minutes and be followed by complete functional recovery. The eventual outcome of the symptoms of basilar artery insufficiency is thrombosis. With each episode some permanent damage results. Treatment is directed toward cerebral vasodilatation and the prevention of thrombosis. For vasodilation, the patient is immediately given inhalations of 5 to 10 per cent carbon dioxide with 90 to 95 per cent oxygen mixture, and inhalations are repeated for ten to fifteen minutes every hour during the hospital stay. Oral dioxylline phosphate (Paveril) in doses of 200 mg. four times daily is continued during hospitalization and after discharge. For anticoagulant effect, the patient is initially given 50 mg. of heparin in aqueous solution intravenously every four hours. Venous clotting time is determined daily in order to determine the effectiveness of this therapy. Clotting time is maintained between twenty and thirty minutes. An initial dose of 900 to 1200 mg. of ethyl biscoumacetate (Tromexan) orally is given as soon as the patient is able to swallow. At the beginning of treatment, the patient also receives 300 mg. of bishydroxycoumarin (Dicumarol). Prothrombin time is determined daily and an attempt made to keep the activity between 10 and 30 per cent. Heparin is discontinued when the prothrombin activity has reached the therapeutic level, usually after twenty-four hours. On that day, a second dose of 200 mg. of Dicumarol is given. This drug is continued. If the patient can be given outpatient anticoagulant therapy, it must be controlled by determining the prothrombin time three times weekly at the outset and at least once weekly thereafter for an indefinite time. Dioxylline

phosphate should be continued indefinitely in all patients. This regimen has proved effective in limiting extension of neurologic deficit and in preventing further attacks of vascular insufficiency.

EXPLORATION DYNAMIQUE DE LA CORTICOSURRÉNALE AU COURS DE L'HYPERTENSION (INVESTIGATION OF ADRENOCORTICAL FUNCTION DURING HYPERTENSION).

Quichard, J.; Lagrue, G.; Jayle, M.-F., and Milliez, P. *Presse méd.* **67:** 329, 1959; through Ciba Literature Review **4:** 162, 1959.

The question of whether, and to what extent adrenocortical function is changed in cases of hypertension was studied in 62 patients with a systolic blood pressure of at least 150 mm. and a diastolic pressure of at least 90 mm. Hg. All except 3 patients had essential hypertension. The urinary 17-hydroxycorticoids and 17-ketosteroids were determined following the intravenous infusion of 25 units of ACTH. Patients with fever, edema, hepatic insufficiency, cardiac insufficiency or pronounced renal insufficiency, as well as those convalescing from infectious diseases or operations, were excluded from the investigation. Most of the patients were receiving a moderate low-salt diet. Separate evaluations were made for men and women. In 40 of the 62 patients, all or some of the tests yielded abnormal results. In cases of "pure" essential hypertension, adrenocortical behavior varied greatly from one person to another. The values were above or below normal in 40 per cent of the cases. Both sexes reacted in more or less the same way. The severity of the hypertension—as reflected by changes in the eye grounds, left ventricular hypertrophy, or the presence of cerebrovascular lesions—had no demonstrable effect on adrenocortical behavior. Involution of the adrenal cortex due to aging did not appear to be affected by hypertension. If endocrine disorders or autonomic nervous dystonia with anxiety states were present in addition to hypertension, the results frequently were abnormal.

CLINICAL EXPERIENCE WITH DESPERIDINE IN THE MANAGEMENT OF HYPERTENSION AND ANXIETY NEUROSIS.

Rawls, W. B., and Evans, W. L., Jr. *New York J. Med.* **59:** 1774 (May 1) 1959.

Desperidine (11-desmethoxyreserpine) was used in the treatment of 40 patients of average age 63 years. Thirty of the patients had hypertension, 19 of them with and 11 without the symptoms of an anxiety neurosis. The 10 nonhypertensive patients had symptoms of nervousness, arthralgia, insomnia, emotional lability, anorexia and dizziness. Twenty-three patients in the first group had some other disease process in addition to hypertension. Seven of the second group had some organic disease process, and 3 were treated because of vague somatic pains, emotional tension, and other symptoms associated with an anxiety neurosis. Desperidine was given in a usual dosage of 0.1 mg. three times daily after meals, with occasionally an additional dose at bedtime. The average duration of treatment was five months. Blood pressure was reduced in the 30 hypertensive patients, the average fall being 33 mm. Hg systolic and 14 mm. diastolic. Complete relief of symptoms of an anxiety neurosis was achieved in 11 of the 29 patients so affected, and in 10 there was partial relief. Ten of 11 patients who had experienced undesirable side-effects while under treatment with reserpine were able to tolerate 0.3 mg. or more of desperidine daily; the other patient tolerated only 0.2 mg. Mild drowsiness occurred with the former dose, but this did not require its discontinuation or reduction. It is concluded that desperidine is effective in the management of essential hypertension and anxiety neurosis. The benefit compares favorably with that obtained with equal doses of reserpine, and the incidence of side-effects is reduced.

A NEW ANTIPHOBIC AGENT, PIPERINDINOETHYL BENZILATE HYDROCHLORIDE (SYCOTROL), IN MANAGEMENT OF ANXIETY NEUROSES WITH VISCERAL SYMPTOMATOLOGY. REPORT ON SEVENTY-TWO CASES.

Rosenblum, L. A. *Antibiotic Med.* **6:** 343 (June) 1959.

Sycotrol possesses mild anticholinergic properties but no sedative or hypnotic action. It has a numbing effect, apparently based upon the reduction of fear. Its actions resemble those of small amounts of alcohol but without a cortical sedative effect. This drug was administered to 72 patients with anxiety and tension, all of whom had previously received sedatives, antispasmodics, ataractic drugs, or hormones. Each had been observed for sufficient periods and the effects of many medications on his complaints were so well known that he could serve as his own control. Fifty-nine patients had complaints referable to the gastrointestinal or cardiovascular systems. The others had such complaints as generalized aches and pains, loss of libido, and agitated depression. The daily dosage of Sycotrol was 12 mg., but a dosage of 15 to 21 mg. was required by some patients, whereas 6 mg. sufficed in others. Treatment was continued for periods of four weeks to one year. Moderate to complete relief of tension and anxiety occurred in three-fourths of the patients with major gastrointestinal symptoms, and in 18 of the 19 with complaints referable to the cardiovascular system. In some instances lowering of hypertensive blood pressure occurred. Moderate benefit also was observed in 4 of 5 patients with senile or parkinsonian tremors, menopausal complaints, tachycardia, or senile paresthesia. No benefit was observed in agitated depression or neurogenic dermatitis. Sycotrol enhanced the responses to antiulcer, quinidine, and endocrine therapy when used in conjunction with them. Patients retained their mental acuity and work ability during therapy and did not become drowsy. The drug caused no addiction, agitation, severe depression, or production or exacerbation of senile reactions in patients 70 years of age or older. Neither did it affect adversely the blood, urine, or weight of any of the patients. Liver and kidney function studies did not reveal any toxic effects.

SPINAL EPIDURAL HEMATOMA DURING ANTICOAGULANT THERAPY.

Winer, B. M.; Horenstein, S., and Starr, A. M. *Circulation* **19:** 735 (May) 1959.

Spinal epidural hematoma occurred in a patient receiving long-term anticoagulant therapy for recurrent and progressive vertebral artery disease. The same dosage had been continued for eight months and the Quick prothrombin time was in the "therapeutic" range. The only cause that could be conceived was straining effort; possibly one of the venules in the epidural space ruptured, and in view of the patient's induced clotting difficulties the bleeding was not arrested. The signs of spinal epidural hematoma can be recognized easily: Acute back pain, and rapidly progressive spinal cord and nerve root deficit, usually with complete spinal block, accompanied by a brownish pigmentation in an acellular cerebrospinal fluid are characteristic. The degree of embarrassment of spinal cord circulation and the amount of pressure necrosis are determined by the location of the bleeding point, the volume of the vertebral canal relative to that part of the spinal cord in the affected area, the proximity of intervertebral foramina, the presence of coagulation defects, and the final volume of the hematoma. The hematoma was removed from this patient. Spinal fluid dynamics returned to normal within one week postoperatively. In the subsequent six months, pain sensation returned to the right lower extremity but no other improvement in function occurred. The paraplegia persisted. The possibility is pointed out that an increased incidence of bleeding after long-term administration of anticoagulants may be due not only to the quantitative factor of the duration of reduced Quick prothrombic activity, but to the qualitative factor of the development of newly arising defects in coagulation after many weeks of administration. Further studies are necessary with regard to the factors that influence the antithrombotic and hemorrhagic effects of anticoagulants. Although the Quick prothrombin time yields information of a general nature, it may not be adequate.

AUTHOR INDEX

ACKERMANN, P. G., *see* Kountz, W. B., 757

ADAMS, JOHN E., *see* Elliot, Henry W., 175

ALLEN, EDWARD B., *see* Clow, Hollis E., 527

ALLISON, JAMES B., *see* Kinsell, Laurance W., 457

ALTARELLI, VINCENT R., *see* Calesnick, Benjamin, 648

ARAVANIS, CHRIST, and HARRIS, RAYMOND: The effect of hydergine on the cardiovascular system of elderly people: electrocardiographic and ballistocardiographic studies, 920

ARP, C. RAYMOND: Obituary of Hal McCluney Davison, 206

ATTINGER, ERNST O. *see* Segal, Maurice S., 240

AUSMAN, DONALD C.: Enhanced absorption of iron with use of a new hematinic agent (preliminary studies), 268

BACHRACH, SAMUEL: A new stimulant supplement for the geriatric patient, 408

BAKER, JEANETTE L.: The unsuccessful aged, 570

BARRIE, ROBERT, *see* Clow, Hollis E., 527

BATTERMAN, ROBERT C.; CARR, JULIUS, and MOURATOFF, GEORGE J.: Enhancement of sodium salicylate absorption and clinical effectiveness by mephenesin, 114

BEDFORD, P. D., and LODGE, BRIAN: Toxic effects of a new anti-lipaemic oestrogenic steroid (Manvene), 911

BENEDEK, THOMAS G.: Pernicious anemia and aging, 573

BERCOWITZ, DONALD; SKLAROFF, DAVID M., and LIKOFF, WILLIAM: Radioactive fat absorptive patterns in the geriatric patient, 741

BERCOVITZ, Z. T.; BRUNSCHWIG, ALEXANDER; CAVE, HENRY W., and LOCALIO, S. ARTHUR: Panel discussion on the clinical management of diseases of the colon, 1

BETHELL, FRANK H., *see* Dameshek, William, 577

BISHOP, LOUIS F.: History of the American Therapeutic Society (1947–1957), 100

BLAND, JOHN H., *see* Dack, Simon, 221

BLITZMAN, LOUIS; ROGERS, EUGENE J., and KENT, ANN P.: A medical geriatric evaluation at a municipal housing project, 360

BLOCH, HELEN, *see* Friedfeld, Louis, 769

BOGER, WILLIAM P.: Sulfaphenazol (Orisul), a long-acting antibacterial sulfonamide, 314

BORTZ, EDWARD L.: Mechanisms of aging, 835

BROWN, ETHAN ALLAN: The treatment of subacute asthma in the older patient, 494

BRUNSCHWIG, ALEXANDER, *see* Bercovitz, Z. T., 1

BURCHENAL, JOSEPH H.; DIAMOND, HENRY D.; ELLISON, ROSE RUTH; ESCHER, GEORGE C.; KARNOFSKY, DAVID A., and MYERS, W. P. LAIRD: Panel discussion of chemotherapy in the palliative treatment of cancer, 379

CALESNICK, BENJAMIN with the technical assistance of ALTARELLI, VINCENT R.: Reduced sedative effect of a newly synthesized reserpine derivative (syrosingopine): clinical appraisal in primary hypertension, 648

CARONNA JOSEPH P., and PIJUKOVIC, MAGDA: *Salmonella typhimurium* in an elderly cardiac patient: a case report, 933

CARR, JULIUS, *see* Batterman, Robert C., 114

CARROLL, GEORGE J.; JENKINS, OWEN, and SWAIN, JO ANN: The use of radioisotopes in a community hospital, 193

CASE, THOMAS C.: Simple surgical therapy for operable carcinoma of the mammary gland, 398

—, and HALSTED, GEORGE O.: Gastric remnant interposition in surgery of the esophago-gastric region: preliminary report, 551

CAVE, HENRY W., *see* Bercovitz, Z. T., 1

CLOW, HOLLIS E.; ALLEN, EDWARD B.; BARRIE, ROBERT; GOLDFARB, ALVIN I.; MARTIN, ALEXANDER REID, and WALL, JAMES H.: Panel discussion on psychotherapeutic measures in the adjustments of our senior citizens, 527

COBB, BEATRIX: Emotional problems of adult cancer patients, 274
COOPER, IRVING S.: Chemosurgery for brain tumor: a preliminary report, 440
—, and POLOUKHINE, NICOLAS: Neurosurgical relief of intention (cerebellar) tremor: a preliminary report, 443

DACK, SIMON; LANDOWNE, MILTON; LUISADA, ALDO A.; BLAND, JOHN H., and HARRIS, RAYMOND: Panel discussion on problems in the diagnosis and management of cardiovascular disease, 221
DAMESHEK, WILLIAM; BETHELL, FRANK H.; REISNER, EDWARD H., JR.; SCHWARTZ, STEVEN O., and TOCANTINS, LEANDRO M.: Panel discussion on the clinical management of blood dyscrasias in the older age group, 577
DEGRAFF, ARTHUR C.: Trends in therapeutic research, 93
DIAMOND, HENRY D., *see* Burchenal, Joseph H., 379
DUVENCI, JALE, *see* Segal, Maurice S., 240

EDWARDS, GERARD: The changing trend of a geriatric ward. A comparative analysis of the admission and discharge rates of patients in one geriatric ward during 1949 and the first quarter of 1959, 862
EHRLICH, MORTIMER E., *see* Friedfeld, Louis, 769
EISLER, LENA: Geriatric social work, 51
ELLIOTT, HENRY W., and ADAMS, JOHN E.; Some aspects of hypothermia during anesthesia, 175
ELLISON, ROSE RUTH, *see* Burchenal, Joseph H., 379
ESCHER, GEORGE C., *see* Burchenal, Joseph H., 379
EVANS, WALTER L., JR., *see* Rawls, William B., 841

FAVOUR, C. B.: Treatment of low-resistance syndromes, 184
FEINGOLD, S. NORMAN, *see* Rudd, J. L., 349
FERTMAN, MILDRED B.: Etiology of severe obesity: a study of five cases, 38
FISHER, E. K., *see* Winsor, Travis, 167
FITZELLE, GEORGE T.: Health problems of a selected group of widows, 782
FOWLER, GEORGE A., *see* Pelner, Louis, 624, 698
FREEMAN, JOSEPH T.: The mechanisms of stress and the forces of senescence, 71
FREIDFELD, LOUIS; SILVER, AARON; NEEDLEMAN, MAX; MAUSNER, SAMUEL; EHRLICH, MORTIMER E.; GOLDFELD, FREDA B.; MICHAELS, RUTH, and BLOCH, HELEN: A geriatric clinic in a general hospital, 769

GARLAND, L. H.: Radiation treatment of cancer, 136
GEIGER, FRANKLIN R.: A new agent (Benulax) for control of the water content of the stool, 795
GLAZENER, FREDERICK S., *see* Hollister, Leo E., 327
GOLDFARB, ALVIN I., *see* Clow, Hollis E., 527
GOLDFELD, FREDA B., *see* Friedfeld, Louis, 769
GOLDNER, MARTIN G., *see* Rosenfeld, Samuel, 502
GRAEF, IRVING, *see* Kinsell, Laurance W., 457
GREEN, MORRIS, *see* Smigel, Joseph O., 61
GREENBLATT, ROBERT B., and SCARPA-SMITH, CLORINDA, J.: Nymphomania in postmenopausal women, 339
GRUNDY, SCOTT M., and JETT, JAMES D.: Incidence of various types of cardiovascular diseases by age group in the male and in the female, 16

HAAG, HARVEY B., *see* McKennis, Herbert, Jr., 848
HALSTED, GEORGE O., *see* Case, Thomas C., 551
HARRIS, RAYMOND, *see* Aravanis, Christ, 920
—, *see* Dack, Simon, 221
HAUSER, EMANUEL: Ménière's disease: a new therapeutic approach, 874
HOLLAND, ALBERT H., JR.: Drugs, doctors and directives, 148
HOLLISTER, LEO E., and GLAZENER, FREDERICK S.: Serum lipid levels in geriatric patients treated with a dietary supplement of unsaturated fatty acids, 327
HOTCHKISS, ROBERT S., *see* Scott, William W., 295
HUDSON, PERRY B., *see* Scott, William W., 295

HUNTER, OSCAR B., JR.: Obituary of Seymour DeWitt Ludlum, 208

IASON, ALFRED H., and PANSKY, BEN: Breast cancer, 800

JENKINS, OWEN, *see* Carroll, George J., 193
JETT, JAMES D., *see* Grundy, Scott M., 16

KARK, ROBERT, *see* Kinsell, Laurance W., 457
KARNOFSKY, DAVID A., *see* Burchenal, Joseph H., 379
KARPMAN, HAROLD L., *see* Winsor, Travis, 335
KENT, ANN P., *see* Blitzman, Louis, 360
KHEIM, T., *see* Kountz, W. B., 757
KINSELL, LAURANCE W.; ALLISON, JAMES B.; GRAEF, IRVING; KARK, ROBERT; POLLACK, HERBERT; SPERRY, WARREN M., and WILKINSON, CHARLES F., JR.: Panel discussion on clinical nutrition and lipid metabolism, 457
KOUNTZ, W. B.; KHEIM, T.; TORO, J.; ACKERMANN, P. G., and TORO, G.: The action of chlorotrianisene (TACE) with androgen on nitrogen retention in elderly people, 757
KRATZER, GUY L., *see* Trimpi, Howard D., 153
KRAUSS, THEODORE, C.: Problems of medical management in homes for the aged, 660

LANDOWNE, MILTON, *see* Dack, Simon, 221
LATTIMER, JOHN K., *see* Scott, William W., 295
LIKOFF, WILLIAM, *see* Berkowitz, D., 741
LOCALIO, S. ARTHUR, *see* Bercovitz, Z. T., 1
LODGE, BRIAN: *see* Bedford, P. D., 911
LOWE, KARL J., *see* Smigel, Joseph O., 61
LUISADA, ALDO A., *see* Dack, Simon, 221

MACAULAY, ALICE, *see* Weller, Charles, 128
MAKARI, JACK G.: Some recent studies in the immunology of cancer. I. Detection of methyl-cholanthrene-like substance by the Schultz-Dale method in the sera of patients with tumors and in some apparently healthy persons, 611
MARTIN, ALEXANDER REID, *see* Clow, Hollis E., 527
MATHES, GORDON L.: Leydig-cell hyperplasia in elderly men, 508
MAUSNER, SAMUEL, *see* Friedfeld, Louis, 769
MASOR, NATHAN: The relation of age and sex to telling lies, 859
MCGAVACK, THOMAS HODGE: A critical appraisal of oral hypoglycemic agents, 681
MCKENNIS, HERBERT, JR., and HAAG, HARVEY B.: On the congeners of whiskey, 848
MEIKLE, R. W.: Treatment of nocturia in the elderly with posterior pituitary snuff, 422
MEYERS, FREDERICK H.: A critique of the concept of sympathetic-parasympathetic antagonism, 120
MICHAELS, RUTH, *see* Friedfeld, Louis, 769
MIGDEN, JACOB: The treatment of iron deficiency in the aged: a controlled study, 928
MISTRETTA, CHARLES V., *see* Rawls, William B., 841
MORAVEC, CLAYTON L., and MORAVEC, MAX E.: Androgen-estrogen-thyroid (Plestran) therapy in geriatric patients, 870
MORAVEC, MAX E., *see* Moravec, Clayton L., 870
MOURATOFF, GEORGE J., *see* Batterman, Robert C., 114
MULLAN, HUGH: The psychiatrist's role in a home for the aging, 938
MYERS, W. P. LAIRD, *see* Burchenal, Joseph H., 379

NAYAMPALLI, S. S., *see* Rosenfeld, Samuel, 502
NEEDLEMAN, MAX, *see* Friedfeld, Louis, 769

PANSKY, BEN, *see* Iason, Alfred H., 800
PAYNE, J. HOWARD, *see* Winsor, Travis, 167
PELNER, LOUIS: Host-tumor antagonism. XII. Possible effect of the cortisone drugs on the development of metastases in patients with carcinoma, 428
—, and FOWLER, GEORGE A.: Host-tumor antagonism. XIII. Sarcoma of the soft tissues treated by bacterial toxins: successful series, 624
—, and FOWLER, GEORGE A.: Host-tumor antagonism. XIV. Sarcoma of the soft tissues treated by bacterial toxins: unsuccessful series, 698

PENNINGTON, VERONICA M.: Benzilic acid diethylaminoethylester hydrochloride (Phobex) in the treatment of chronically psychotic patients, 79
—: Meprobamate-benactyzine (Deprol) in the treatment of chronic brain syndrome, schizophrenia and senility, 656
PIJUKOVIC, MAGDA, *see* Caronna, Joseph P., 933
POLLACK, HERBERT, *see* Kinsell, Laurance W., 457
POTTENGER, FRANCIS M., JR.: Obituary of Harold Guyon Trimble, 210

RAWLS, WILLIAM B.; EVANS, WALTER L., JR.; SCHRRIPA, FRANCO G., and MISTRETTA, CHARLES V.: Effect of saturated and unsaturated fatty acids upon heparin-retarded clotting time, 841
REISNER, EDWARD H., JR., *see* Dameshek, William, 577
ROGERS, EUGENE J.: Rehabilitation of chronically ill geriatric patients: adjunctive use of an ataractic and nutritional-hormone preparation, 410
—: *see* Blitzman, Louis, 360
ROSENFELD, SAMUEL; NAYAMPALLI, S. S., and GOLDNER, MARTIN G.: An evaluation of orphenadrine hydrochloride (Disipal), 502
ROSS, C. HOWARD: Geriatrics unlimited, 880
RUDD, J. L., and FEINGOLD, S. NORMAN: Medical and vocational cooperation in a geriatric workshop, 349
RUDD, THOMAS N.: Human problems in geriatrics, with special reference to fecal incontinence, 565
—:Preventing senile dementia: the need for a new approach, 322

SCARPA-SMITH, CLORINDA J., *see* Greenblatt, Robert B., 339
SCHRRIPA, FRANCO G., *see* Rawls, William B., 841
SCHWARTZ, STEVEN O., *see* Dameshek, William, 577
SCHWARTZ, WILLIAM: Examination of an electrocardiogram, 488
SCOTT, WILLIAM WALLACE; HOTCHKISS, ROBERT S.; HUDSON, PERRY B.; LATTIMER, JOHN K., and WHITMORE, WILLET F., JR.: Panel discussion on the clinical management of prostatic disease, 295
SEGAL, MAURICE S.; ATTINGER, ERNST O., and DUVENCI, JALE: Chronic cor pulmonale—its management. Notes on the use of chlorothiazide (Diuril), 240
SELIGMAN, BERT: Arteriosclerosis obliterans; an epitome, 161
SETTEL, EDWARD: Buclizine, a new tranquilizing agent, 67
—: Clinical study with a new hydrocholeretic drug and a new hydrocholeretic-antispasmodic combination, 265
—: Enzymatic factors in protein malnutrition of the geriatric patient, 416
—: Stimulant therapy with deanol in depression, migraine and tension headaches, 877
SHERSON, JACOB, *see* Shubin, Harry, 405
SHUBIN, HARRY, and SHERSON, JACOB: Prochlorperazine in the management of restive aged patients, 405
SILVER, AARON, *see* Friedfeld, Louis, 769
SKLAROFF, DAVID M., *see* Berkowitz, Donald, 741
SMIGEL, JOSEPH O.; LOWE, KARL J., and GREEN, MORRIS: Emotional and psychic problems of institutionalized geriatric patients: evaluations of hydroxyzine, 61
SOMMER, ROBERT: Cooking skills of geriatric patients, 343
SPERRY, WARREN M., *see* Kinsell, Laurance W., 457
STANTON, ROBERT H.: A simplified explanation of hypercholesterolemia, 916
STARR, PAUL: The definition and diagnosis of hypothyroidism, 105
SWAIN, JO ANN, *see* Carroll, George J., 193
SWARTZ, FREDERICK C.: What is aging?, 905

TOCANTINS, LEANDRO M., *see* Dameshek, William, 577
TORO, G., *see* Kountz, W. B., 757
TORO, J., *see* Kountz, W. B., 757
TRIMPI, HOWARD D., and KRATZER, GUY L.: Alloy steel wire as a suture material for open anastomoses of the large intestine, 153

VAN DER REIS, LEO: Benign prostatic hypertrophy and coronary heart disease: correlation or coincidence?, 866

WALL, JAMES H., *see* Clow, Hollis E., 527
WEBB, MARVIN W.: Longitudinal sociopsychologic study of a randomly selected group of institutionalized veterans, 730
WELLER, CHARLES, and MACAULAY, ALICE: Preliminary clinical observations on the use of a biguanide (DBI) as an oral hypoglycemic agent, 128
WHITMORE, WILLET F., JR., *see* Scott, William W., 295
WILKINSON, CHARLES F., JR., *see* Kinsell, Laurance W., 457
WINSOR, TRAVIS; FISHER, E. K., and PAYNE, J. HOWARD: A method for the study of peripheral arteriosclerosis, 167
—, and KARPMAN, HAROLD L.: Self-regulating prophylactic regimen for angina pectoris, 335

SUBJECT INDEX

ABSTRACTS of Current Literature, 81, 210, 286, 368, 446, 512, 596, 664, 746, 822, 889, 947

ACTH (adrenocorticotropic hormone): *see* Pituitary

ADRENALECTOMY: *see* Adrenals

ADRENALS: *see also* Endocrine; Hormones
- — adrenalectomy for cancer, 379
- — adrenocortical hormones in treatment of asthma, 488
- — adrenocortical hormones in treatment of cancer, 379
- — cortisone and susceptibility to infection, 184
- — cortisone drugs; possible effect of, on development of cancer metastases, 428
- — dexamethasone (Decadron) therapy in Ménière's disease, 874
- — prednisolone (Meticortelone) and cortisone in the treatment of ulcerative colitis, 1

AEROSOLS: *see* Drugs

AGE: *see also* Geriatrics; and under various systems and diseases
- — age and sex; relation to telling lies, 859
- — age groups in males and females; incidence of CV diseases according to, 16
- — aged institutionalized patients; hydroxyzine in treatment of psychic problems, 61
- — aged patients, restive; prochlorperazine in management of, 405
- — aged; the unsuccessful, 570
- — aging; mechanisms of, 835
- — aging; pernicious anemia and response to vit. B_{12} in, 573
- — Duke Univ. Center for Study of Aging, 525, 608
- — effect of age on incidence of breast cancer, 800
- — elderly cardiac patient; S. typhimurium septicemia in; limitations of antibiotic therapy, 933
- — elderly men with prostatic carcinoma; incidence of Leydig-cell hyperplasia in, 508
- — elderly people; action of TACE with androgen on N retention in, 757
- — elderly people; effect of Hydergine on B. P., heart rate, ECG and BCG in, 920
- — happier old age; Public Affairs Comm. pamphlet, 609
- — home for the aged; social worker in, 51
- — home for the aging; psychiatrist's role in, 938
- — homes for the aged; problems in medical management, 660
- — in relation to fat tolerance, 741
- — in relation to response of soft-tissue sarcoma to bacterial toxins, 698
- — incidence of pernicious anemia, 573
- — institutionalized veterans; socio-psychologic study, 730
- — old age and chronic disease; trends in therapeutic research, 93
- — old age group; cardiovascular problems; panel discussion, 221
- — older age group; clinical management of blood dyscrasias; panel discussion, 577
- — older age group; diseases of the colon in; panel discussion, 1
- — older men; prostatic disease in; panel discussion, 295
- — older patients; serum lipid levels as affected by dietary unsat'd fatty acids, 327
- — older patients; treatment of subacute asthma in, 494
- — older persons; clinical nutrition and lipid metabolism; panel discussion, 457
- — PBI and I^{131} uptake with aging, 71
- — senescence, forces of, and the mechanisms of stress, 71
- — senile chronically psychotic patients; Phobex in treatment of, 79
- — senile dementia, prevention of; need for new approach, 322
- — senility and chronic brain syndrome; treatment with meprobamate-benactyzine (Deprol), 656
- — senior citizens; psychotherapeutic measures in adjustments of; panel discussion, 527
- — the aged; buclizine therapy in, 67
- — the aged with iron deficiency; use of D-sorbitol for enhancement of iron absorption, 928

— the elderly; nocturia in, treated with post. pituitary snuff, 422
— what is aging? 905
— widows; health problems of, 782
AGING: *see* Age; Geriatrics
ALCOHOL in whiskey; relation to congeners, 848
ALDEHYDES; congeners of whiskey, 848
ALKYLATING compounds in treatment of cancer, 379
ALLERGENS in treatment of asthma, 488
ALLERGIC factor in Ménière's disease, 874
ALLOY steel wire for sutures, 153
AMERICAN GERIATRICS SOCIETY
— annual meeting 1959; announcement of: *see* back ad. pages 38 (Jan.), 38 (Feb.), 34 (Mar.), 34 (Apr.) with program, and 28 (May) with program
— annual meeting 1960; announcement of: *see* back ad pages 30 (Sept.), 26 (Oct.), 35 (Nov.), and 34 (Dec.)
— committee appointments, *see* back ad. pages each month under American Geriatrics Society
— fellowship in, *see* back ad. pages each month under American Geriatrics Society
— Journal of the American Geriatrics Society, *see* front ad. pages each month under Journal of the American Geriatrics Society
— officers and board of directors, *see* each month, back ad. pages under American Geriatrics Society, and front ad. pages under Journal of the American Geriatrics Society
AMERICAN INSTITUTE of Ultrasonics in Medicine; 1959 annual meeting, 679
AMERICAN THERAPEUTIC SOCIETY
— annual meeting, 1959; announcement of: *see* back ad. pages 41 (Feb.), 37 (Mar.), 39 (Apr.), and 33 (May)
— history of (1947–1957), 100
— issue of the Journal of the American Geriatrics Society, February number
— officers and council, *see* back ad. pages each month under American Therapeutic Society
AMINOPHYLLINE: *see* Drugs
ANDROGENS: *see also* Hormones; Testis; Sex
— androgen and estrogen therapy for breast cancer, 379
— androgen-estrogen-thyroid (Plestran) therapy, 870
— methyltestosterone, with and without TACE; action on N retention in the elderly, 757
ANEMIA: *see* Blood
ANESTHESIA: *see* Surgery
ANGINA PECTORIS: *see* Heart
ANTIBACTERIAL sulfonamide, long-acting, 314
ANTIBIOTICS: *see* Drugs
ANTIGENS: *see* Immunology
ANTIHISTAMINICS: *see* Drugs, buclizine, etc.
ANTIHYPERTENSIVE THERAPY: *see* Vascular system; Drugs
ANTIMETABOLITES in treatment of cancer, 379
ANXIETY: *see* Mental
AORTA: *see* Vascular system
APPETITE in obesity, 38
ARTERIAL; ARTERIES: *see* Vascular system
ARTERIOSCLEROSIS: *see* Vascular system
ARTHRITIS: *see* Joints
ASPIRIN: *see* Drugs
ASTHMA: *see* Lungs and Bronchi
ATARATIC AGENTS: *see* Drugs, tranquilizers
ATARAX (hydroxyzine): *see* Drugs
ATHEROSCLEROSIS: *see* Vascular system
AUTHOR INDEX to Vol. VII, 959

BACTERIAL TOXINS in the treatment of sarcoma of the soft tissues, 624, 698
BALLISTOCARDIOGRAM: *see* Heart
BASAL METABOLIC RATE: *see also* Thyroid
— in severe obesity, 38
— in the diagnosis of hypothyroidism, 105
BENACTYZINE: *see* Drugs, meprobamate-benactyzine
BENIGN PROSTATIC HYPERTROPHY: *see* Prostate
BENULAX: *see* Drugs
BENZILIC ACID diethylaminoethylester (Phobex): *see* Drugs.
BIGUANIDE (DBI): *see* Drugs; Diabetes
BILIARY TRACT: *see* Liver and Gall bladder
BIOPHYSICS in therapeutic research, 93
BLADDER
— gall: *see* Liver and Gall bladder
— urinary: *see* Urine
BLOOD: *see also* Vascular system; Heart; and under constituent involved
— anemia, severe, associated with S. typhimurium infection, 933
— anemias and blood volume studied with Co^{60} and Cr^{51}, 193

BLOOD—*Continued*
— cells of, in low-resistance syndromes, 184
— clotting time, heparin-retarded; effect of saturated and unsat'd fatty acids on, 841
— diseases; incidence of, in a geriatric clinic, 769
— dyscrasias (incl. p. anemia, leukemia, mult. myeloma); clinical management of, in older age group; panel discussion, 577
— hemogram in severe obesity, 38
— hemorrhage (melena) in diseases of the colon; management, 1
— hyperlipemia and hypercholesterolemia, 457
— iron-deficiency anemia in the aged; treatment by hematinic + D-sorbitol, 928
— leukemia in the aged; treatment, 577
— leukemia; methyl-cholanthrene-like substance in, by Schultz-Dale test, 611
— leukemia; radiation therapy, 136
— leukemias; chemotherapy of, 379
— leukopenia and tranquilizers, 577
— levels of salicylic acid in evaluation of effect of mephenesin on absorption, 114
— lipid levels after treatment with dietary unsat'd fatty acids, 327
— new hematinic agent (Simron), 268
— pernicious anemia and aging; response to vit. B_{12}, 573, 577
— septicemia from S. typhimurium in an elderly cardiac patient; limitations of antibiotic therapy, 933
— serum acid phosphatase in prostatic cancer, 295
— sulfaphenazol (Orisul) levels after oral dose, 314
— thrombocytopenic purpura in the aged, 577
BLOOD PRESSURE: *see* Vascular system; Heart
BOOKS RECEIVED: 91, 676, 901
BONE: *see also* Joints
— marrow in blood dyscrasias of the elderly; multiple myeloma, 577
— marrow: *see also* Blood
— osteoporosis; clinical nutrition, 457
— regeneration; effect of bacterial toxin therapy on, 698
BRAIN: *see also* Mental; Nervous system
— cerebellar (intention) tremor; neurosurgical relief of, 443
— cerebral arteriosclerosis; Metrazol in management of, 527
— cerebral arteriosclerosis: *see also* Vascular system
— cerebrospinal fluid: sulfaphenazole level in, after oral dose, 314
— chronic brain syndrome and schizophrenia; meprobamate-benactyzine (Deprol) in treatment of, 656
— hypothalamic factor in obesity, 38
— surgery; anesthesia-hypothermia for; effect on EEG, 175
— tumors; chemosurgery for, 440
BREAST: *see also* Cancer
— cancer; a review, 800
— cancer; hormonal and chemotherapy of, 379
— cancer; radiation treatment of, 136
— operable carcinoma of; simple surgical therapy for, 398
— tenderness and hypertrophy of, during therapy with antilipemic estrogenic steroid (Manvene), 911
BRONCHI: BRONCHITIS: *see* Lungs and Bronchi

CALCIUM: *see also* Bone
— hypercalcemia in cancer patients; relation to hormone therapy, 377
CANCER: *see also* Tumors
— accessible and inaccessible; radiation treatment of; indications for, and results, 136
— adult cancer patients; emotional problems of, 274
— as related to blood dyscrasias in the elderly, 577
— chemotherapy in palliative treatment of; panel discussion, 379
— host-tumor antagonism. XII. Possible effect of cortisone drugs on development of metastases, 428. XIII. Sarcoma treated with bacterial toxins, successfully, 624. XIV. Unsuccessfully, 698
— immunology; methyl-cholanthrene-like substance in serum (Schultz-Dale test), 611
— incidence of, in chronic ulcerative colitis and in diverticulitis, 1
— malignant tumors of soft tissues treated by bacterial toxins, 624, 698

— of breast; a review, 800
— of esophagus; gastric remnant interposition in treatment of, 551
— of mammary gland, operable; simple surgical therapy for, 398
— prostatic; incidence of Leydig-cell hyperplasia in, 508
— prostatic; panel discussion, 295
— various cancers; hormonal and chemotherapy of, 379
CARBOHYDRATE METABOLISM: *see also* Diabetes; Insulin
— acidosis during anesthesia-hypothermia, 175
— carbohydrate requirements; dietary balance, 457
— DBI (a biguanide) as an oral hypoglycemic agent, 128
— oral hypoglycemic agents versus insulin; sites of action, 681
— urinary glucose in severe obesity, 38
CARBON DIOXIDE production during hypothermia, 175
CARBUTAMIDE: *see* Drugs, hypoglycemic agents
CARCINOMA: *see* Cancer
CARDIAC: CARDIOVASCULAR: *see* Heart; Vascular system
CASTRATION: *see* Ovary; Testis
CELLS
— aging of, 835, 905
— Leydig, *see* Testis
— of blood: *see* Blood
— of tissues in low-resistance syndromes, 184
— vaginal; *see* Vaginal
CEREBELLUM: *see* Brain
CEREBROSPINAL FLUID: *see* Brain
CEREBROVASCULAR: *see* Brain; Vascular system
CHANGING TREND of a geriatric ward (1949 *vs.* 1959), 862
CHEMOSURGERY: *see* Surgery
CHEMOTHERAPY: *see also* Drugs
— for breast cancer, 800
— in the palliative treatment of cancer; panel discussion, 379
CHLORAMBUCIL: *see* Drugs
CHLOROMYCETIN: *see* Drugs
CHLOROPURINE: *see* Drugs
CHLOROTHIAZIDE (Diuril): *see* Drugs
CHLOROTRIANISENE (TACE) with androgen; *see* Estrogens; Androgens
CHLORPROPAMIDE: *see* Drugs, hypoglycemic agents
CHOLESTEROL: *see also* Lipids; Fats
— hypercholesterolemia; panel discussion on lipid metabolism, 457
— hypercholesterolemia; treatment with corn or safflower oil and pyridoxine, 916
— new antilipemic estrogenic agent (Manvene); toxic effects of, 911
— of blood in peripheral arteriosclerosis; effect of thyroid hormones, β-pyridyl carbinol, SC 8346, and fats on (Vasograph), 167
— of serum after treatment of arteriosclerotic patients with unsat'd fatty acids, 327
of serum in severe obesity, 38
CHROMIUM^{51} in studies of blood volume and red-cell survival, 193
CHRONIC BRAIN SYNDROME: *see* Brain; Mental
CHRONICALLY ILL: *see* Age; Geriatrics; Mental; Rehabilitation
CIRRHOSIS: *see* Liver and Gall Bladder
CLOTTING TIME: *see* Blood
COBALT^{60} in study of pernicious anemia, 193
COLEY'S TOXINS in treatment of sarcoma of soft tissues, 624, 698
COLLAGEN; changes in, produced by aging, 835
COLON; COLITIS: *see* Gastro-intestinal tract
COMMUNITY hospital; use of radioisotopes in, 193
COMPAZINE: *see* Drugs, prochlorperazine
CONCEPTS of aging, 71, 835, 905
CONGENERS of whiskey, 848
CONSTIPATION: *see* Gastro-intestinal tract
CONTENTS of Vol. VII: *see* December issue, back page iii
COOKING skills of geriatric patients, 343
CORONARY DILATOR (pentaerythritol nitrate): *see* Drugs; Heart
CORONARY HEART DISEASE: *see* Heart; Vascular system
COR PULMONALE: *see* Heart; Vascular system
CORN OIL: *see* Fats
CORTISONE: *see* Adrenals; Hormones
COURSE in Rehabilitation Care of the Chronically Ill (New York Med. College), 756
CRITICAL APPRAISAL of oral hypoglycemic agents, 681

CRITIQUE of concept of sympathetic-parasympathetic antagonism, 120

DAY Centers: *see* Age; Geriatrics; Rehabilitation
DBI: *see* Drugs, hypoglycemic agents; Diabetes
DEAFNESS; Ménière's disease treated with dexamethasone, 874
DEANER; DEANOL: *see* Drugs
DECADRON (adrenocorticosteroid): *see* Adrenals
DEFINITION and diagnosis of hypothyroidism, 105
DEMENTIA: *see* Mental
DEPROL: *see* Drugs, meprobamate-benactyzine
DEXAMETHASONE (adrenocorticosteroid): *see* Adrenals
DIABETES: *see also* Carbohydrate metabolism; Insulin
— DBI (a biguanide) as an oral hypoglycemic agent, 128
— Diabetes Association (Florida); annual meeting, 756
— hypoglycemic agents (oral); critical appraisal of, 681
DIET: *see also* Nutrition
— dietary habits in obesity, 38
— dietary supplement of unsat'd fatty acids; effect on serum lipids, 327
— in ulcerative colitis, 1
DIGITALIS: *see* Drugs; Heart
DIGUANIDES: *see* Drugs, hypoglycemic agents
DIRECTIVES; drugs and doctors, 148
DISIPAL: *see* Drugs, orphenadrine
DIURETICS: *see* Drugs; Heart
DIURIL: *see* Drugs, chlorothiazide
DIVERTICULITIS: *see* Gastro-intestinal tract
DOCTORS, drugs and directives, 148
DON: *see* Drugs
DRUGS: *see also* Hormones
— ACTH: *see* Pituitary
— adrenocortical hormones: *see* Adrenals
— aerosols (bronchodilator) for treatment of cor pulmonale, 240
— aminophylline therapy for cor pulmonale, 240
— androgens: *see* Androgens
— antibiotics and electrolytes in treatment of diseases of the colon, 1
— antibiotics in treatment of low-resistance syndromes; tissue deficits, 184
— aspirin and blood cells, 577
— Atarax for geriatric patients, 410
— Benulax, for control of water content of stool, 795
— benzilic acid diethylaminoethylester hydrochloride (Phobex) in treatment of chronically psychotic patients, 79
— buclizine; tranquilizing, antihistaminic, anti-emetic and hypotensive agent, 67
— chlorambucil in treatment of cancer, 379
— Chloromycetin and other antibiotics; limitations in treatment of S. typhimurium septicemia, 933
— chloropurine in treatment of cancer, 379
— chlorothiazide (Diuril) in the management of chronic cor pulmonale, 240
— cortisone: *see* Adrenals
— DBI (a biguanide) as an oral hypoglycemic agent, 128
— deanol (Deaner) stimulant therapy in depression syndromes, and migraine and tension headaches, 877
— dexamethasone (Decadron): *see* Adrenals
— digitalis in treatment of cor pulmonale, 240
— DON in the palliation of cancer, 379
— drugs, doctors and directives, 148
— D-sorbitol for enhancement of iron absorption in the aged, 928
— Dulcolax in treatment of fecal incontinence, 565
— estrogens: *see* Estrogens
— hematinic agent (Simron), 268
— heparin-retarded clotting time; effect of fatty acids on, 841
— hormones: *see* Hormones; and under endocrine gland involved
— Hydergine; effect on CV system in the elderly; ECG and BCG studies, 920
— hydrocholeretic and antispasmodic drugs; Zanchol (florantyrone) and Prozanchol, 265
— hydroxyzine (Atarax) in treatment of emotional and psychic problems in instit'd geriatric patients, 61
— hypoglycemic agents (oral); critical appraisal of, 681
— insulin: *see* Insulin; Diabetes
— Krebiozen in treatment of cancer, 379

— Manvene: *see* Estrogens
— mephenesin (Mephosal combination); effect on absorption and effectiveness of sodium salicylate or aspirin, 114
— meprobamate-benactyzine (Deprol) in the treatment of chronic brain syndrome, schizophrenia and senility, 656
— mercaptopurine in treatment of cancer, 379
— methyltestosterone: *see* Androgens
— Metrazol + nicotinic acid in management of cerebral arteriosclerosis, 527
— Myleran (triethylene thiophosphoramide) in treatment of cancer, 379
— nicotinic acid and heparin in treatment of hypercholesterolemia, 916
— nitrogen mustard in treatment of cancer, 379
— nutritional-hormone preparation (Neobon) for geriatric patients, 410
— opiates (meperidine) for treatment of cor pulmonale, 240
— orphenadrine hydrochloride (Disipal); an evaluation of in parkinsonism, 502
— pentaerythritol nitrate; use of in angina pectoris, 335
— Plestran: *see* Hormones
— potassium iodide in treatment of asthma, 488
— prochlorperazine (Compazine) in management of restive aged patients, 405
— β-pyridyl carbinol (Roniacol) and SC 8246; effect on blood cholesterol and lipid P in peripheral arteriosclerosis (Vasograph), 167
— Ritonic; stimulant supplement for the geriatric patient, 408
— salicylate (sodium); absorption enhanced by mephenesin, 114
— sulfaphenazol (Orisul), a long-acting antibacterial sulfonamide; comparison with sulfamethoxypyridazine and sulfisoxazole, 314
— syrosingopine (Singoserp); new reserpine derivative with reduced sedative effect; appraisal in hypertension, 648
— TACE: *see* Estrogens
— thioTEPA in the treatment of cancer, 379
— thyroid therapy: *see* Thyroid
— tranquilizing drugs in management of the elderly, 527
— trends in therapeutic research (desirable and undesirable), 93
— triethylene melamine (TEM) in treatment of cancer, 379
D-Sorbitol: *see* Drugs
Duke University Center for Study of Aging, 525, 608
Dulcolax: *see* Drugs
Dyscrasias of blood; panel discussion: *see* Blood

Edema

— in chronic cor pulmonale; treatment, 240
— of CV disease, 221
Elderly: *see* Age; Geriatrics
Electrocardiogram (ECG): *see* Heart
Electroencephalogram (EEG): *see* Brain, surgery
Electrolyte disturbances in CV disease, 221
Embolism: *see* Lungs; Vascular system
Emotion: *see* Mental
Emphysema: *see* Lungs, cor pulmonale
Endocrine: *see also* Androgens; Estrogens; Hormones; and under various endocrine glands
— factors in coronary disease, 16
— mechanisms in the aging body, 71
— system in severe obesity, 38
Environment re aging: *see* Age; Geriatrics; Mental
Enzymes
— enzymatic factors in protein malnutrition, 416
— lipase (pancreatic) deficiency in hypercholesterolemia, 916
— phosphatase, acid, of serum in prostatic cancer, 295
Epitome of arteriosclerosis obliterans, 161
Ergot: *see* Drugs, Hydergine
Esophago-Gastric region; gastric remnant interposition in surgery of, 551
Estrogens: *see also* Hormones; Ovary: Sex
— chlorotrianisene (TACE) with androgen; stilbestrol; action on N retention in elderly people, 757
— estrogen and androgen therapy for breast cancer, 379
— estrogen - androgen - thyroid (Plestran) therapy in the aged, 870
— estrogen; effect on testicular Leydig cells in prostatic cancer, 508
— estrogen therapy for prostatic cancer, 295

ESTROGENS—*Continued*
— estrogenic antilipemic steroid (Manvene); toxic effects of, 911
— estrogens; relation to hypercholesterolemia, 916
— urinary estrogen excretion during treatment with TACE + androgen 757
ETHYL ALCOHOL: *see* Alcohol
ETIOLOGY of severe obesity, 38
EXAMINATION of an electrocardiogram, 488

FAMILY history in 5 cases of obesity, 38
FATS AND FATTY ACIDS: *see also* Cholesterol; Lipids; Obesity
— corn or safflower oil; effect on blood cholesterol and lipid P in peripheral arteriosclerosis (Vasograph), 167
— corn or safflower oil plus pyridoxine in treatment of hypercholesterolemia, 916
— fatty acids; requirements; sources, 457
— fatty acids, saturated and unsat'd (cream, corn oil & safflower oil); effect on heparin-retarded clotting time, 841
— fatty acids, unsat'd (vegetable oil emulsions); serum lipid levels after treatment with, 327
— radioactive fat absorptive patterns in geriatric patients, 741
FATTY ACIDS: *see* Fats and Fatty acids
FECAL: *see* Gastro-intestinal tract
FEDERAL Food, Drug and Cosmetic Act, and The Federal Register, 148
FEMALE: *see* Sex; Ovary
FLORANTYRONE: *see* Drugs, hydrocholeretic
FLORIDA Diabetes Association; 1959 annual meeting, 756
FOLIC ACID antagonists in treatment of cancer, 379
Food: *see also* Diet; Nutrition; Vitamins
— Federal Food, Drug and Cosmetic Act, 148
— food habits in obesity, 38
— food; influence on HR clotting time, 841
— food poisoning: *see* Salmonella
FURFURAL; FUSEL OIL: congeners of whiskey, 848

GALL BLADDER: *see* Liver and Gall bladder
GANGLIONIC blocking drugs: *see* Drugs
GASTRO-INTESTINAL TRACT
— abdominal surgery; anesthesia-hypothermia for, 175
— absorption of iron in the aged enhanced by D-sorbitol, 928
— absorption of salicylates enhanced by mephenesin, 114
— cancer of the rectum; radiation treatment of, 136
— carcinoma of the colon; management (incl. use of radioisotopes), 1
— colitis (ulcerative), fulminating and chronic; management, 1
— colon, diseases of; panel discussion on clinical management, 1
— constipation, biliary; new hydro-
— choleretic drug for, 265
— digestive disturbances and Plestran therapy, 870
— diverticulitis; clinical management, 1
— fecal incontinence and impaction in the aged; treatment, 565
— gastric effects of new estrogenic antilipemic agent (Manvene), 911
— gastric factor in blood dyscrasias of the aged, 577
— gastric remnant interposition in surgery of esophago-gastric region, 551
— gastro-enteritis from S. typhimurium infection; limitations of antibiotic therapy, 933
— intestines; sympathetic and parasympathetic innervations; critique of concept of antagonisms, 120
— large intestine, open anastomoses of; alloy steel wire for sutures, 153
— melena, severe; clinical management, 1
— peptic esophagitis; gastric remnant interposition in surgical treatment of, 551
— water content of stool; new agent (Benulax) for control of, 795
GENERAL hospital; geriatric clinic in, 769
GERIATRICS: *see also* Age
— American Geriatrics Society: *see* American Geriatrics Society
— concepts of aging, 71, 835, 905
— geriatric clinic in a general hospital, 769
— geriatric evaluation, medical, at a municipal housing project, 360
— geriatric patients; androgen-estrogen-thyroid (Plestran) therapy in, 870
— geriatric patients; buclizine in treatment of, 67
— geriatric patients; cooking skills of, 343

— geriatric patients; enzymatic factors in protein malnutrition of, 416
— geriatric patients, institutionalized; emotional and psychic problems; evaluation of hydroxyzine, 61
— geriatric patients; new stimulant supplement (Ritonic) for, 408
— geriatric patients; radioactive fat absorptive patterns in, 741
— geriatric patients treated with ataractic and nutritional hormone preparation, 410
— geriatric patients treated with dietary unsat'd fatty acids; effect on serum lipid levels, 327
— geriatric patients with chronic psychoses; Phobex in treatment of, 79
— geriatric research priorities, 835
— geriatric social work, 51
— geriatric ward; changing trend (1949 *vs.* 1959), 862
— geriatric workshop; medical and vocational cooperation in, 349
— geriatrics; human problems in; fecal incontinence, 565
— geriatrics unlimited, 880
GERONTOLOGICAL
— Research Foundation; annual essay contest, 525, 608
— Society, Inc.; 1959 annual meeting, 607
GERONTOLOGY: *see* Age; Geriatrics
γ-GLOBULIN: *see* Protein
GLUCOSE: *see* Carbohydrate metabolism; Diabetes
GLUTAMINE antagonists in treatment of cancer, 379
GLYCOSURIA: *see* Carbohydrate metabolism; Diabetes
GONADOTROPIN: *see also* Pituitary; Hormones
— excretion in severe obesity, 38
GOVERNMENT and Medicine, 93, 148
GRAFTS: *see* Surgery
GROWTH; dynamics of, 835
GUANIDINES: *see* Drugs, hypoglycemic agents

HEADACHES: *see* Nervous system
HEALTH
— problems of a selected group of widows, 782
— programs: *see* Age; Geriatrics; Mental
HEART: *see also* Vascular system
— angina pectoris; self-regulating prophylactic regimen for; use of pentaerythritol tetranitrate, 335
— cardiac disease and hypercholesterolemia, 916
— cardiac surgery; anesthesia-hypothermia for; effect on ECG, 175
— cardiovascular disease; incidence in a geriatric clinic, 769
— cardiovascular disease treated with new antilipemic agent (Manvene); toxic effects, 911
— cardiovascular diseases; incidence by age group in males and females, 16
— cardiovascular system; panel discussion on problems in diagnosis and management, 221
— congenital cardiovascular anomalies according to sex, 16
— cor pulmonale, chronic; chlorothiazide in management of, 240
— coronary atherosclerosis and atherogenic index, 16
— coronary heart disease and benign prostatic hypertrophy; correlation or coincidence? 866
— elderly cardiac patient; S. typhimurium septicemia in; limitations of antibiotic therapy, 933
— electro- and ballistocardiograms, blood pressure and heart rate in the elderly; effect of Hydergine on, 920
— electrocardiogram; examination of, 488
— myocardial infarction; radioactive fat absorption patterns in study of, 741
— rheumatic heart disease and atrial fibrillation according to age and sex, 16
HEMATINIC AGENTS: *see* Blood; Drugs; Iron
HEMOGLOBIN: *see* Blood
HEMORRHAGE: *see* Blood; and under disease involved
HEPARIN: *see* Drugs
HISTORY of American Therapeutic Society (1947–1957), 100
HODGKIN'S DISEASE; radiation therapy, 136
HOMES for the aging: *see* Age; Geriatrics
HORMONES: *see also* Androgens; Estrogens; Insulin; Endocrine; and the various endocrine glands
— ACTH (adrenocorticotropic hormone): *see* Pituitary

HORMONES—*Continued*
— adrenocortical steroids: *see* Adrenals
— androgens: *see* Androgens
— chlorotrianisene (TACE): *see* Estrogens
— cortisone: *see* Adrenals
— dexamethasone: *see* Adrenals
— diethylstilbestrol: *see* Estrogens
— estrogens: *see* Estrogens
— gonadotropin: *see* Pituitary
— hormonal factors in edema, 221
— hormonal treatment of prostatic cancer, 295
— hormone-nutritional preparations for geriatric patients, 408, 410
— induction of hypercalcemia by, in breast cancer, 379
— insulin: *see* Insulin
— Manvene (estrogenic): *see* Estrogens
— methyltestosterone: *see* Androgens
— Plestran (androgen-estrogen-thyroid) therapy in geriatric patients, 870
— posterior pituitary snuff: *see* Pituitary
— prednisolone: *see* Adrenals
— progestational agents in treatment of nymphomania, 339
— sex hormone therapy for breast cancer, 800
— sex hormone therapy: *see also* Androgens; Estrogens
— stilbestrol: *see* Estrogens
— TACE: *see* Estrogens
— testosterone: *see* Androgens
— thyroid therapy: *see* Thyroid; Iodine
— various, in the aging body, 71
HOST
— defense mechanisms, 184
— -tumor antagonism: *see* Cancer; Tumors
HOUSING project, municipal; medical geriatric evaluation in, 360
HRCT (heparin-retarded clotting time): *see* Blood
HUMAN problems: *see* Age; Geriatrics; Mental
HYDERGINE (ergot prep.): *see* Drugs
HYDROCHOLERETIC drug (florantyrone, Zanchol); *see* Drugs
HYDROXYZINE (Atarax): *see* Drugs
HYPERCALCEMIA: *see* Calcium
HYPERCHOLESTEROLEMIA: *see* Cholesterol
HYPERGLYCEMIA: *see* Carbohydrate metabolism; Diabetes
HYPERLIPEMIC: *see* Fats; Lipids
HYPERTENSION: *see* Vascular system
HYPERTROPHY of the prostate: *see* Prostate
HYPNOSIS: *see* Mental
HYPOGLYCEMIA: *see* Carbohydrate metabolism; Diabetes
HYPOGLYCEMIC AGENTS: *see also* Carbohydrate metabolism; Diabetes
— DBI, 128
— oral hypoglycemic agents; critical appraisal, 681
HYPOPHYSECTOMY: *see* Pituitary
HYPOTENSIVE drugs: *see* Drugs; Vascular system
HYPOTHALAMUS: *see* Brain
HYPOTHERMIA: *see* Surgery
HYPOTHYROIDISM: *see* Thyroid

IMMUNOLOGY
— host defense mechanisms, 184
— host-tumor antagonism, 428, 624, 698
— of cancer, 611
IMPACTION, fecal: *see* Gastro-intestinal tract
INCONTINENCE, fecal: *see* Gastro-intestinal tract
INDEX TO ADVERTISERS: *see* Contents page each month
INDEX TO VOL. VII
— author, 959
— subject, 964
INDUSTRY
— incidence of hypothyroidism among men in (So. California), 105
— retirement plans (Du Pont) in big corporations, 880
INFECTIONS: *see* Bacteria; Drugs (antibiotics, sulfonamides); Low-resistance; Septicemia; Toxins
INSTITUTIONS for the aged; *see* Age; Geriatrics
INSULIN: *see also* Carbohydrate metabolism; Diabetes
— insulin versus oral hypoglycemic agents, 128, 681
— relation to atherosclerosis, 457
INTENTION (cerebellar) tremor: *see* Brain
INTERSTITIAL CELLS: *see* Testis
INTESTINES: *see* Gastro-intestinal tract
IODINE: *see also* Thyroid
— I^{131} in evaluation of thyroid function, 193
— I^{131} Rose Bengal in det'n of liver function, 193
— I^{131}-triolein absorption patterns in study of atherosclerosis, 741
— PBI and I^{131} uptake, with aging, 71

— PBI in diagnosis of hypothyroidism, 105
— PBI in severe obesity, 38
— potassium iodide in treatment of asthma, 488
IRON: *see also* Blood, anemia; Gastro-intestinal tract
— enhanced absorption of, with use of new hematinic agents, 268, 928

JOINTS
— arthritic and rheumatic conditions; enhancement of salicylate absorption and effectiveness by mephenesin, 114
— arthritis, crippling; attitude toward between two widows, 782
JOURNAL OF THE AMERICAN GERIATRICS SOCIETY: Editors, editorial board and information: *see* front ad. pages each month

17-KETOSTEROIDS: *see* Adrenals (adrenal steroids); Urine
KIDNEY: Nocturia treated with post. pituitary snuff, 422
KREBIOZEN: *see* Drugs

LEUKEMIA: *see* Blood
LEUKOCYTES: *see* Blood
LEUKOPENIA: *see* Blood
LEYDIG CELLS: *see* Testis
LIES; relation of sex and age to telling of, 859
LIPASE: *see* Enzymes; Fats; Lipids
LIPIDS: *see also* Cholesterol; Fats
— antilipemic estrogenic agent (Manvene); toxic effects of, 911
— lipid P of serum in periph. arteriosclerosis; effect of thyroid hormones, β-pyridyl carbinol, SC 8246, and fats on (Vasograph), 167
— hyperlipemia, 457
— hyperlipemic hypercoagulability; effect of dietary fatty acids on HR clotting time, 841
— lipid metabolism and clinical nutrition; panel discussion, 457
— lipid metabolism in the aged studied by radioactive fat absorption patterns, 741
— of serum, and coronary disease, 16
— of serum in geriatric patients treated with dietary unsat'd fatty acids, 327
LIPOPROTEINS: *see* Lipids: protein
LITERATURE, current; abstracts of: *see* Abstracts
LIVER AND GALL BLADDER
— biliary disease; new hydrocholeretic and new hydrocholeretic-antispasmodic drugs, 265
— cirrhosis; bleeding esophageal varices; gastric remnant interposition in treatment of, 551
— liver; action of oral hypoglycemic agents on, 681
— liver function; I^{131} Rose Bengal in study of, 193
LONG-ACTING antibacterial sulfonamide, 314
LONGITUDINAL sociopsychologic study of randomly selected group of instit'd veterans, 730
LOW-RESISTANCE syndromes and state of tissue cells: treatment, 184
LUNGS AND BRONCHI
— asthma, subacute; treatment of, in the older patient, 494
— cancer; chemotherapy of, 379
— cancer; radiation treatment of, 136
— in chronic cor pulmonale; hemodynamic changes, 240
— pulmonary function tests, 494
LYMPHATICS of the mammary gland, 398, 800
LYMPHOCYTES: *see* Blood; Lymphoid tissue
LYMPHOID TISSUE
— lymphoid and connective tissue; possible dissemination of cancer through alterations in, by cortisone, 428
— lymphoid elements re resistance to infection, 184
LYMPHOMA; chemotherapy of, 379
LYMPHOSARCOMA; radiation therapy, 136

MALE: *see* Sex; Testis
MALNUTRITION: *see* Nutrition
MAMMARY GLAND: *see* Breast
MANVENE: *see* Estrogens
MASTECTOMY: *see* Breast; Surgery
MECHANISMS
— of aging, 835, 905
— of stress and forces of senescence, 71
MEDICAL: *see also* Age; Geriatrics; Mental; Rehabilitation
— and vocational cooperation in a geriatric workshop, 349
— geriatric evaluation at a municipal housing project, 360
— licensure, 148
MEETINGS: *see* American Geriatrics Society; American Therapeutic Society; News and Notices

MELENA: *see* Gastro-intestinal tract, bleeding
MÉNIÈRE'S DISEASE; new therapeutic approach (dexamethasone), 874
MENOPAUSE: *see* Ovary
MENTAL: *see also* Brain; Nervous system; Stress
— anxiety and agitation syndromes treated with buclizine, 67
— changing trend of a geriatric ward, 862
— chronic psychoses; Phobex in treatment of, 79
— dementia, senile; need for new approach in prevention of, 322
— depression syndromes and migraine; stimulant therapy with deanol, 877
— emotional and psychic problems in institutionalized geriatric patients; evaluation of hydroxyzine, 61
— emotional factors in obesity, 38
— emotional problems of adult cancer patients, 274
— geriatrics unlimited, 880
— health problems of widows, 782
— human problems in geriatrics; fecal incontinence, 565
— hypnosis in treatment of emotional difficulties in the aged, 527
— medical evaluation of geriatric patients in a housing project, 360
— mental factors in nymphomania in postmenopausal women, 339
— motivation and training in overcoming stigmata of senescence, 905
— motivation for cooking in geriatric instit'd patients, 343
— problems of medical management in homes for the aged, 660
— psychiatric and psychosocial findings in geriatric clinic of a general hospital, 769
— psychiatrist's role in a home for the aging, 938
— Psychosomatic Medicine, Academy of; annual meeting, 679
— psychotherapeutic measures in the adjustments of our senior citizens; panel discussion, 527
— restive aged patients; prochlorperazine in treatment of, 405
— schizophrenia and chronic brain syndrome; meprobamate - benactyzine (Deprol) in treatment of, 656
— screening patients for admission to home for the aged, 51
— sociopsychologic study of institutionalized veterans, 730
— stress and the forces of senescence, 71
— stress in relation to aging, 905
— telling lies; relation to age and sex, 859
— unsuccessful aged, 570
MEPHENESIN; MEPHOSAL: *see* Drugs
MEPROBAMATE-BENACTYZINE (Deprol): *see* Drugs
MERCAPTOPURINE: *see* Drugs
METABOLIC changes due to hypothermia, 175
METAHEXAMIDE: *see* Drugs, hypoglycemic agents
METASTASES: *see also* Cancer
— development of, as affected by cortisone drugs, 428
— in breast cancer, 800
METHODS: *see also* Tests
— for anesthesia-hypothermia, 175
— for processing an electrocardiogram, 488
— for pulmonary function tests; vitalometer, timed, 494
— for study of peripheral arteriosclerosis (Vasograph), 167
METHYL-CHOLANTHRENE-LIKE substance in sera of patients with tumors (Schultz-Dale method), 611
METHYLTESTOSTERONE: *see* Androgens; Hormones
METICORTELONE (prednisolone): *see* Adrenals
METRAZOL: *see* Drugs
MOTIVATION: *see* Mental
MYELOMA, multiple: *see* Bone, marrow; Blood, dyscrasias
MYLERAN (triethylene thiophosphoramide): *see* Drugs
MYOCARDIAL: *see* Heart

NASAL congestion as side-effect; syrosingopine versus reserpine, 648
NEGROES; effects of syringopine on hypertension in, 648
NEOBON: *see* Drugs, nutritional supplement
NERVOUS SYSTEM: *see also* Brain; Mental; Stress
— ganglionic-blocking agents, *see* Drugs
— headaches (migraine and tension) and depression syndromes; deanol therapy for, 877

— Ménière's disease; new therapeutic approach (dexamethasone), 874
— neurosurgical relief of intention tremor, 443
— pain; relief of, during bacterial toxin therapy for sarcoma, 698
— parkinsonism; evaluation of orphenadrine (Disipal) therapy in, 502
— sedative and hypotensive effects of syrosingopine versus reserpine, 648
— sympathetic-parasympathetic antagonism; critique of the concept, 120
— tranquilizers, sedatives, stimulants, etc.: *see* Drugs
NEUROPSYCHIATRIC disorders: *see* Brain; Nervous system; Mental
NEUROSURGICAL relief of intention tremor, 443
NEWS AND NOTICES, 220, 525, 607–610, 679, 756, 902
NICOTINIC ACID: *see* Drugs
NITROGEN: *see also* Nutrition: Protein
— mustard in treatment of cancer, 379
— retention in elderly people; action of TACE + androgen on, 757
NOCTURIA: *see* Urine
NOTICES: *see* American Geriatrics Society; American Therapeutic Society; News and Notices
NUTRITION: *see also* Vitamins
— clinical; lipid metabolism; panel discussion, 457
— malnutrition, protein; enzymatic factors in, 416
— nutritional-hormone preparations: *see* Drugs; Hormones
— retention of N in elderly people; action of sex hormones on, 757
NYMPHOMANIA in postmenopausal women, 339

OBESITY, severe; etiology; clinical data, 38
OBITUARIES
— Davison, Hal McC., 206
— Ludlum, S. DeWitt, 208
— Trimble, Harold G., 209
OIL: *see* Fats
OLD AGE: *see* Age; Geriatrics
OLDER PATIENTS: *see* Age; Geriatrics
OPIATES: *see* Drugs
ORISUL (sulfaphenazol): *see* Drugs
ORPHENADRINE hydrochloride (Disipal): *see* Drugs
OSTEOPOROSIS: *see* Bone
OVARY: *see also* Estrogens; Hormones; Pregnancy
— castration for breast cancer, 379
— gonadal changes and obesity, 38
— oophorectomy for breast cancer, 800
— ovarian cancer; chemotherapy of, 379
— postmenopausal women with nymphomania; hormonal therapy in, 339
OXYGEN, in treatment of cor pulmonale, 240

PAIN: *see* Nervous system
PANCREAS: *see also* Diabetes; Insulin
— hypoglycemic agents versus insulin, 128, 681
— pancreatin in treatment of hypercholesterolemia, 916
— role of pancreas in protein malnutrition, 416
PANCREATIN: *see* Pancreas
PANEL DISCUSSIONS
— blood dyscrasias; clinical management in the older age group, 577
— cardiovascular disease; problems in diagnosis and management of, 221
— chemotherapy in the palliative treatment of cancer, 379
— clinical nutrition and lipid metabolism 457
— colon, diseases of; clinical management, 1
— prostatic disease; clinical management of, 295
— psychotherapeutic measures in the adjustments of our senior citizens, 527
PARASYMPATHETIC NERVOUS SYSTEM: *see* Nervous system
PARKINSONISM (Parkinson's disease): *see* Nervous system
PENTAERYTHRITOL TETRANITRATE: *see* Drugs; Heart
PEPTIC ESOPHAGITIS: *see* Gastro-intestinal tract
PERIPHERAL VASCULAR DISEASE: *see* Vascular system
PERNICIOUS ANEMIA: *see* Blood
PERSONALITY problems: *see* Mental
PHAGOCYTOSIS and resistance to infection, 184
PHENETHYLDIGUANIDE: *see* Drugs, hypoglycemic agents
PHOBEX: *see* Drugs
PHOSPHATASE: *see* Blood; Enzymes

PHOSPHORUS
— lipid P of serum in periph. arteriosclerosis; effect of thyroid hormones, β-pyridyl carbinol, SC 8246, and fats on (Vasograph), 167
— radioactive, in treatment of cancer, 379
PHOTOS wanted of physicians driving ancient cars, 220
PHYSICAL ACTIVITY in cardiovascular disease, 221
PITUITARY
— ACTH in treatment of cancer, 379
— gonadotropin excretion in severe obesity, 38
— hypophysectomy for cancer, 295, 379, 800
— posterior pituitary snuff in treatment of nocturia, 422
— roentgenographic picture of, in severe obesity, 38
PLESTRAN (hormone combination): *see* Hormones
POSTMENOPAUSAL: *see* Ovary
PREDNISOLONE: *see* Adrenals; Hormones
PREGNANCY, in relation to response of soft-tissue sarcoma to bacterial toxins, 698
PROBLEMS
— health, of a selected group of widows, 782
— in diagnosis and management of cardiovascular disease; panel discussion, 221
— of medical management in homes for the aged, 660
PROCHLORPERAZINE (Compazine): *see* Drugs
PROGESTERONE: *see* Hormones, progestational; Ovary
PROSTATE: *see also* Testis
— cancer; hormonal and chemotherapy of, 379
— carcinoma; distribution of testicular cells in patients with, 508
— prostatic disease; clinical management of; panel discussion, 295
— prostatic fluid; test for cancer, 295
— prostatic hypertrophy, benign, and coronary heart disease; correlation or coincidence? 866
PROTEIN: *see also* Lipids, lipoproteins; Nitrogen
— gamma-globulin in low-resistance syndromes, 184
— nitrogen retention; action of TACE + androgen on, 757
— protein malnutrition; enzymatic factors in, 416
— protein-bound iodine (PBI) of serum: *see* Iodine
— requirements; sources, 457
PROZANCHOL: *see* Drugs, hydrocholeretic
PSYCHIATRIC: *see* Mental; Brain
PSYCHIATRIST'S ROLE in a home for the aging, 938
PSYCHOLOGIC: *see also* Mental; Brain
PSYCHOSOMATIC MEDICINE, Academy of; annual meeting, 679
PSYCHOTHERAPEUTIC: *see* Mental
PUBLIC AFFAIRS COMMITTEE (New York City); pamphlet on Plans for a Happier Old Age, 609
PULMONARY: *see* Lungs and Bronchi
PULMONARY HEART DISEASE (cor pulmonale): *see* Heart; Vascular system
PURPURA: *see* Vascular system
PYRIDOXINE: *see* Vitamins, B_6
β-PYRIDYL CARBINOL (Roniacol): *see* Drugs

RADIATION

— radiation therapy for breast cancer, 800
— radiation therapy for prostatic cancer, 295
— radiation therapy in palliative treatment of cancer, 379
— radiation treatment of cancer; indications for, dosages, and results, 136
— radioactive isotopes in treatment of cancer, 379
— radioisotopes; use of, in a community hospital, 193
— x-ray therapy, adjunctive, in some cases of sarcoma treated with bacterial toxins, 624, 698
RADIOACTIVE fat absorptive patterns in the geriatric patient, 741
RADIOIODINE: *see* Iodine
RADIOISOTOPES: *see* Radiation; and under specific element
RAUWOLFIA: *see* Drugs, reserpine, etc.
RECREATION: *see* Age; Geriatrics; Rehabilitation
RECTUM: *see* Gastro-intestinal tract
REHABILITATION: *see also* Age; Geriatrics; Mental

— changing trend in geriatric ward (1949 *vs.* 1959), 862
— course in rehabilitation care of the chronically ill (New York Med. College, 756
— geriatric clinic in a general hospital, 769
— geriatric workshop, 349
— geriatrics unlimited, 880
— need for, among geriatric patients in a housing project, 360
— need for new approach in prevention of senile dementia, 322
— of chronically ill geriatric patients, using ataractic and nutritional hormone preparation, 410
— of the unsuccessful aged, 570
— problems of medical management in homes for the aged, 660
— psychiatrist's role in a home for the aging, 938
—remedial gymnasts; role in geriatric ward, 862
— sociopsychologic study of institutionalized veterans, 730
RESEARCH
— cardiovascular, 221
— geriatric; priorities, 835
— therapeutic; trends in, 93
RESERPINE: *see* Drugs
RESTIVE patients: *see* Mental
RETICULOENDOTHELIAL SYSTEM and low-resistance syndromes, 184
RETIREMENT: *see also* Age; Geriatrics; Rehabilitation
— plans for, in big corporations, 880
— policies and practices in the American economy; announcement of study, 902
RHEUMATIC DISORDERS: *see also* Joints
— antirheumatic effect of salicylates; enhancement by mephenesin, 114
RITONIC: *see* Drugs
RONIACOL (γ-pyridyl carbinol): *see* Drugs
ROSE BENGAL I^{131} in study of liver function, 193

SAFFLOWER Oil: *see* Fats
SALICYLATE: *see* Drugs
SALMONELLA typhimurium septicemia in an elderly cardiac patient; limitations of antibiotic therapy, 933
SARCOMA: *see* Tumors
SATURATED FATS: *see* Fats
SC 8246: *see* Drugs
SCHIZOPHRENIA: *see* Mental
SCHULTZ-DALE TEST: *see* Cancer; Tests
SEDATIVES: *see* Drugs
SELF-REGULATING prophylactic regimen for angina pectoris, 335
SENESCENCE: *see also* Age; Geriatrics
— forces of, and the mechanisms of stress, 71
— mechanisms of aging, 835, 905
SENILITY: *see also* Age; Geriatrics, Mental
— meprobamate-benactyzine (Deprol) in treatment of, 656
— senile dementia, prevention of; need for new approach, 322
SENIOR CITIZENS: *see* Age; Geriatrics
SEPTICEMIA from S. typhimurium; limitations of antibiotic therapy, 933
SEX: *see also* Breast; Hormones; Ovary; Testis; Prostate; Uterus
— and age; relation to telling lies, 859
— in relation to response of soft-tissue sarcoma to bacterial toxins, 698
— male and female; incidence of cardiovascular diseases in, by age group, 16
— women, geriatric, in a municipal housing project; medical evaluation, 360
— women, postmenopausal; nymphomania in, 339
— widows; health problems of, 782
SEX HORMONES: *see* Androgens; Estrogens; Hormones
SIMRON: *see* Drugs, hematinic
SINGOSERP: *see* Drugs (syrosingopine)
SKIN; cancer of skin, lip, mouth or larynx; radiation treatment of, 136
SNUFF, posterior pituitary, in treatment of nocturia, 422
SOCIAL WORK, geriatric, 51
SOCIO-ECONOMIC aspects of aging: *see* Age; Geriatrics; Rehabilitation
SOCIOPSYCHOLOGIC: *see* Mental
SODIUM SALICYLATE absorption enhanced by mephenesin, 114
STEEL (alloy) wire for sutures, 153
STEROIDS: *see also* Hormones
— adrenocortical steroids: *see* Adrenals
— androgens (testosterone): *see* Androgens
— estrogens: *see* Estrogens
— 17-ketosteroid excretion in severe obesity, 38

STEROIDS—*Continued*
— progestational agents in treatment of nymphomania, 339
STIMULANT therapy: *see* Drugs
STOMACH: *see* Gastro-intestinal tract
STOOL (feces): *see* Gastro-intestinal tract
STRESS: *see also* Mental; Nervous system
— in relation to aging, 905
— in relation to coronary disease and benign prostatic hypertrophy, 866
— in the development of hypercholesterolemia, 916
— mechanisms of, and the forces of senescence, 71
SUBJECT INDEX TO VOL. VII, 964
SULFAPHENAZOL (Orisul): *see* Drugs
SULFONAMIDES: *see* Drugs
SULFONYLUREAS: *see* Drugs, hypoglycemic agents
SUPPLEMENTS, medicinal: *see* Drugs
SURGERY: *see also* specific disease or system
— alloy steel wire as suture for open anastomoses of large intestine, 153
— chemosurgery for brain tumor, 440
— gastric: *see also* Gastro-intestinal tract
— grafts, aortic, for periph. arteriosclerosis; effect measured by Vasograph, 167
— hypothermia during anesthesia in cranial, thoracic and abdominal surgery, 175
— of arteriosclerosis obliterans, including vessel grafting, 161
— of breast cancer, 800
— of diseases of the colon, 1
— of esophago-gastric region; gastric remnant interposition, 551
— neurosurgical relief of intention tremor, 443
— simple surgical therapy for operable carcinoma of the mammary gland, 398
SUTURE material: *see* Surgery
SYMPATHETIC NERVOUS SYSTEM: *see* Nervous system
SYNTHALIN: *see* Drugs, hypoglycemic agents
SYROSINGOPINE: *see* Drugs

TACE: *see* Estrogens; Hormones
TANNINS; congeners of whiskey, 848
TEMPERATURE; hypothermia; some aspects of, during anesthesia, 175
TESTIS: *see also* Androgens; Hormones; Prostate; Sex
— castration and estrogen therapy for prostatic cancer, 295
— Leydig (interstitial) cell hyperplasia; incidence of, in elderly men with Ca. of prostate; effect of estrogen, 508
— loss of libido during treatment with estrogenic antilipemic steroid (Manvene), 911
TESTOSTERONE: *see* Androgens; Hormones; Testis
TESTS: *see also* Methods
— for breast cancer, 800
— on body fluids, for prostatic cancer, 295
— Schultz-Dale test in detection of methyl-cholanthrene-like substance in cancer serum, 611
THERAPEUTICS: *see also* Drugs; Hormones; Mental; Surgery
— American Therapeutic Society: *see* American Therapeutic Society
— drugs, doctors and directives, 148
— history of Am. Therapeutic Society (1947–1957), 100
— therapeutic research; trends in, 93
THIO-TEPA: *see* Drugs
THROMBOCYTOPENIA: *see* Blood
THROMBOPHLEBITIS: *see* Vascular system
THROMBOSIS: *see* Vascular system
THYROID: *see also* Iodine; Hormones
— function studied with I^{131}, 193
— hormones (triiodothyronine and triac); effect on blood cholesterol and lipid P in periph. arteriosclerosis (Vasograph), 167
— hypofunction and hypercholesterolemia, 916
— hypothyroidism; definition and diagnosis; incidence among men in industry So. California), 105
— thyroid-androgen-estrogen (Plestran) therapy, 870
— thyroid therapy and the blood count, 577
— thyroidal I^{131} uptake: *see also* Iodine
— thyroxine and triiodothyronine in relation to hypothyroidism, 105
THYROXINE: *see* Thyroid
TIME in relation to aging, 905
TISSUE
— cells and low-resistance syndromes, 184
— cells in aging, 835, 905
— lymphoid *see* Lymphoid tissue
TRANQUILIZING drugs: *see* Drugs; Mental

TREMOR, cerebellar (intention): *see* Brain; Nervous system
TRENDS
— trend, changing, in a geriatric ward, 862
— trends in therapeutic research (desirable and undesirable), 93
TRIETHYLENE MELAMINE (TEM): *see* Drugs
TRIETHYLENE THIOPHOSPHORAMIDE (Myleran): *see* Drugs
TRIIODOTHYRONINE: *see* Thyroid
TOLBUTAMIDE: *see* Drugs, hypoglycemic agents
TONICS: *see* Drugs
TOXIC EFFECTS
— of oral hypoglycemic agents, 681
— side-effects of syrosingopine versus reserpine, 648
TOXINS
— bacterial, in treatment of sarcoma of soft tissues, 624, 698
— Salmonella septicemia, 933
TUMORS: *see also* Cancer
— accessible and inaccessible; radiation treatment of, 136
— brain tumors; chemosurgery for, 440
— cancer, carcinoma: *see* Cancer, and under organ involved
— sarcoma of soft tissues treated by bacterial toxins; successful series, 624; unsuccessful series, 698
— tumors; methyl-cholanthrene-like substance in serum of patients with (Schultz-Dale test), 611

ULCERATIVE COLITIS: *see* Gastro-intestinal tract
ULTRASONICS, American Institute of; annual meeting, 679
UNDESIRABLE trends in therapeutic research, 93
UNSATURATED FATS: *see* Fats
UNSUCCESSFUL aged, 570
URINARY BLADDER: *see* Urine
URINE: *see also* Kidney; and under urinary constituent or disease involved
— excretion of estrogen during treatment with TACE + androgen, 757
— excretion of glucose, gonadotropin and 17-ketosteroids in severe obesity, 38
— hypercalciuria induced by hormone therapy in breast cancer, 379
— nocturia in the elderly treated with post pituitary snuff, 422
— sulfaphenazol (Orisul) excretion after oral dose, 314
— urinary bladder; sympathetic and parasympathetic innervations; critique of concept of antagonism, 120
— urinary retention in prostatic disease, 295
UTERUS; cancer of; radiation treatment, 136

VAGINAL smear; effect of TACE and of stilbestrol on, 757
VARICES: *see* Vascular system
VASCULAR SYSTEM: *see also* Heart; Blood
— aortic surgery; anesthesia-hypothermia for, 175
— arteries of breast, 800
— arteriosclerosis, cerebral; Metrazol in management of, 527
— arteriosclerosis; effect of unsat'd fatty acids on serum lipid levels in, 327
— arteriosclerosis obliterans; pathophysiology and treatment, 161
— arteriosclerotic patients with chronic psychoses; Phobex in treatment of, 79
— atherosclerosis re nutrition and lipid metabolism, 457
— atherosclerosis studied by radioactive fat absorption patterns in the aged, 741
— blood pressure, heart rate, ECG and BCG; effect of Hydergine on, in the elderly, 920
— blood pressure in severe obesity, 38
— cardiovascular disease; incidence of, in a geriatric clinic, 769
— cardiovascular disease; problems in diagnosis and management; panel discussion, 221
— coronary heart disease and benign prostatic hypertrophy; correlation or coincidence? 866
— hypertension; incidence of, by age and sex, 16
— hypertension, primary; effect of syrosingopine in, 648
— hypertensive cardiac disease, 16
— in chronic cor pulmonale, 240
— peripheral arteriosclerosis; method for study (Vasograph); effect of aortic grafts, thyroid hormones, β-pyridyl carbinol, SC 8246, and fats, 167
— thrombocytopenic purpura in the aged, 577
— thrombo-embolic accidents; effect of fatty acids upon clotting time, 841

VASCULAR SYSTEM—*Continued*
— varices, bleeding esophageal; gastric remnant interposition in treatment of, 551
— vascular disease; new antilipemic agent for (Manvene); toxic effects, 911
VASODILATORS: *see* Drugs; Vascular system
VASOGRAPH, for study of peripheral arteriosclerosis, 167
VEGETABLE OIL: *see* Fats and Fatty Acids
VETERANS, institutionalized; longitudinal sociopsychologic study of, 730
VITALOMETER: *see* Lungs; Methods
VITAMINS: *see also* Nutrition; Drugs
— requirements; sources, 457
— vitamin B_{12} in treatment of blood dyscrasias in the elderly, 573, 577
— vitamin B_6 (pyridoxine) with corn oil in treatment of hypercholesterolemia, 916
— vitamin-hormone and stimulant or ataractic therapy for geriatric patients, 408, 410

WATER
— and electrolyte disturbances in CV disease, 221
— content of stool; Benulax for control of, 795
WHISKEY; the congeners of, 848
WIDOWS; health problems of, 782
WORKSHOPS: *see also* Geriatrics; Rehabilitation
— geriatric; medical and vocational cooperation in, 349
— geriatrics unlimited, 880
WOUND healing; effect of bacterial toxin therapy on, 698

X-RAY: *see* Radiation

ZANCHOL: *see* Drugs, hydrocholeretic

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(1) Talbot, J. H.: Arth. & Rheumat. 2:182 (April) 1959. (2) Burns, J. J.; Yü, T. F.; Berger, L., and Gutman, A. B.: Am. J. Med. 25:401 (Sept.) 1958.

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CONTENTS

What is Aging? *Frederick C. Swartz* 905

Toxic Effects of a New Antilipaemic Oestrogenic Steroid (Manvene). *P. D. Bedford and Brian Lodge* 911

Treatment of Hypercholesterolemia, Based on a Simplified Theory. *Robert H. Stanton* 916

The Effect of Hydergine on the Cardiovascular System of Elderly People: Electrocardiographic and Ballistocardiographic Studies. *Christ Aravanis and Raymond Harris* 920

The Treatment of Iron Deficiency in the Aged: A Controlled Study. *Jacob Migden* 928

Salmonella typhimurium Septicemia in an Elderly Cardiac Patient: A Case Report. *Joseph P. Caronna and Magda Pijukovic* 933

The Psychiatrist's Role in a Home for the Aging. *Hugh Mullan* 938

Abstracts of Current Literature 947

Author Index for Volume VII 959

Subject Index for Volume VII 964

The American Geriatrics Society 33

The 1960 Annual Meeting 34

Index to Advertisers 40

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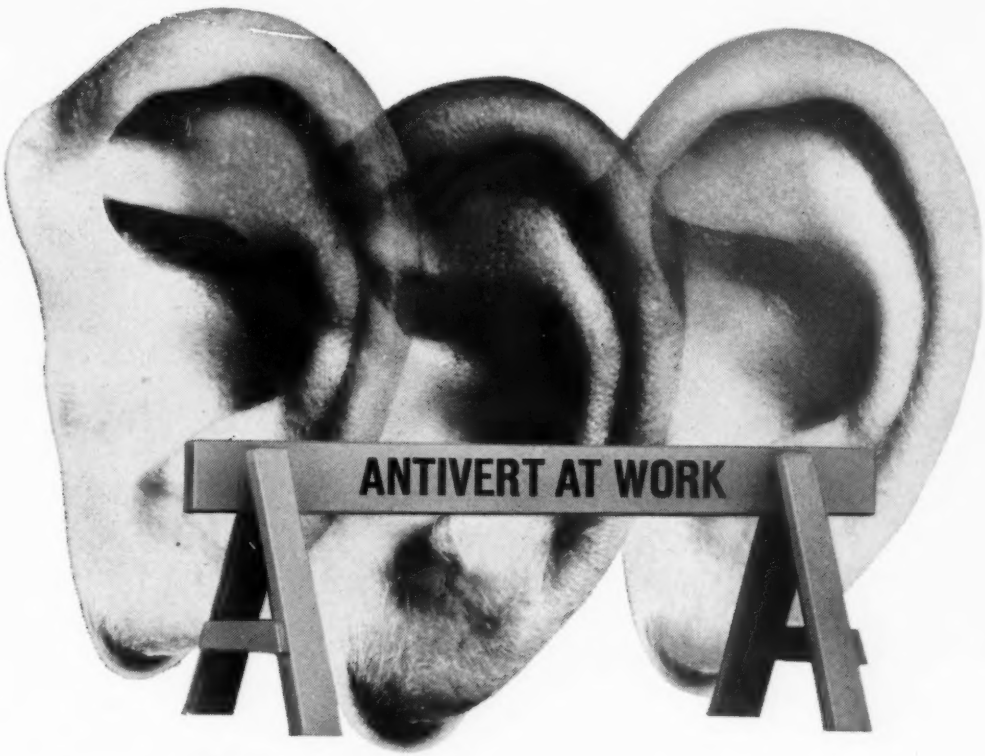

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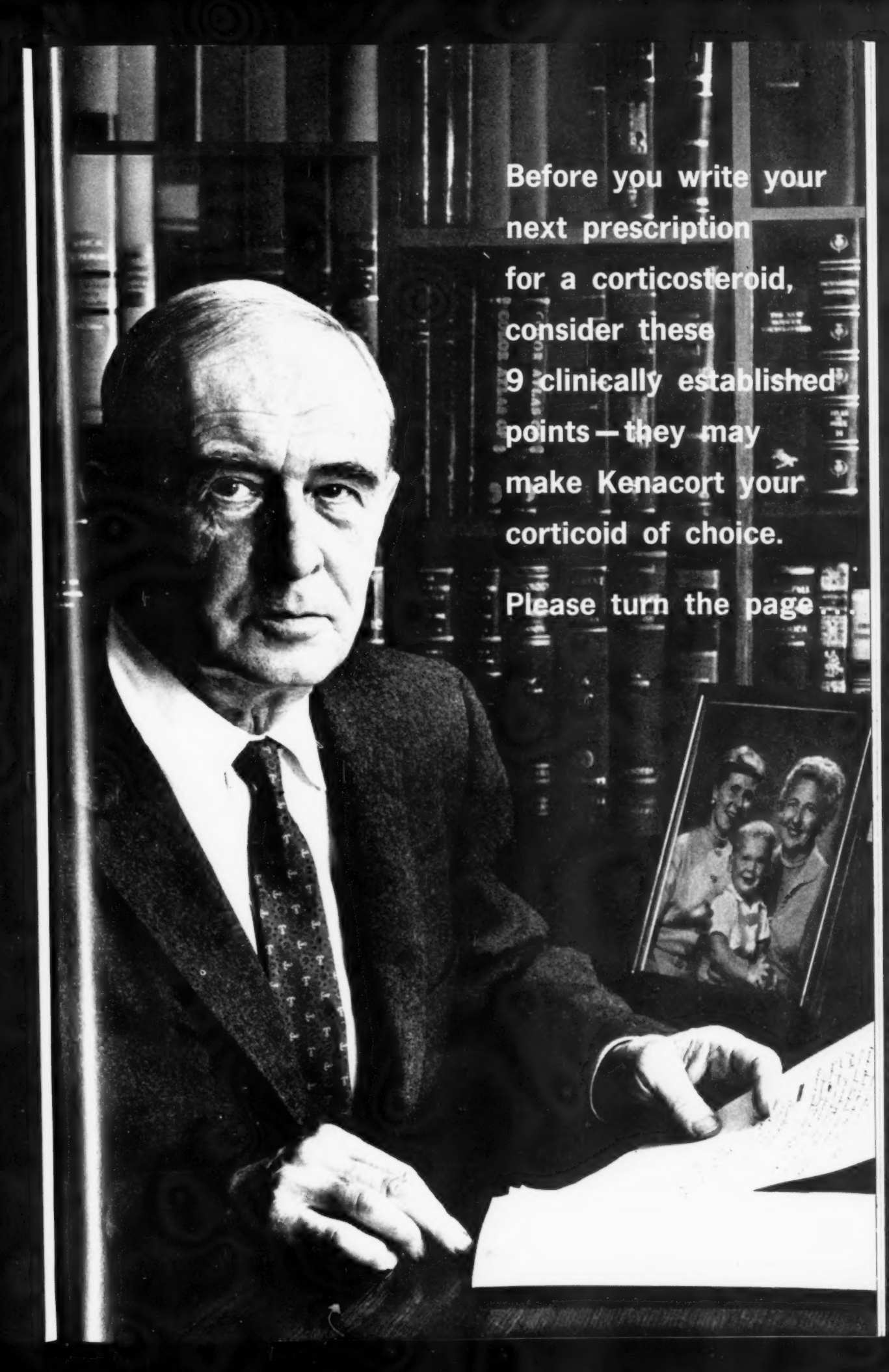
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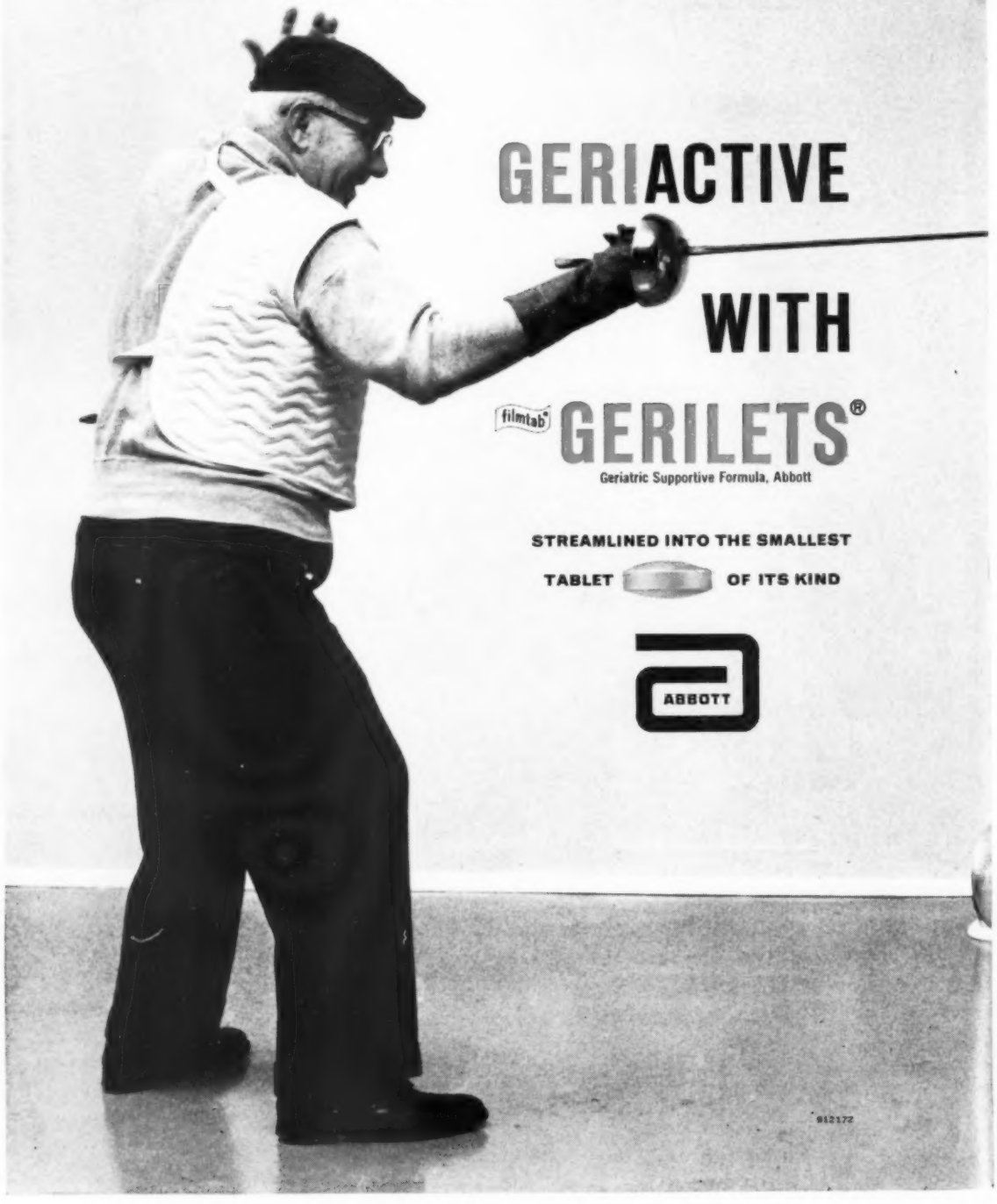

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SQUIBB *Squibb Quality—the Priceless Ingredient*

IS THIS YOUR PATIENT?

1.

EARLY POSTMENOPAUSE

Complains of low back pain, vague aches and fatigue

Posture is poor

No x-ray evidence of bone lesions

2.

LATER POSTMENOPAUSE

Back pain is severe, spreading to hips ("girdle pain")

Patient is round shouldered, walks with a stoop

X-ray reveals compression fractures of lower vertebrae

3.

70 AND OVER

Fracture of hip after a minor fall

X-ray reveals fracture of neck of femur

X-ray reveals compression fractures of lower lumbar vertebrae

These three patients have osteoporosis. Early diagnosis and treatment with "Formatrix" is important because osteoporosis is probably the only age change that can be averted. With "Formatrix" therapy, relief from the symptoms of *low back pain, vague aches* and *fatigue* may be obtained in as little as a few weeks. "Formatrix" supplies the essential materials to stimulate increased bone formation and prevent further loss of bone substance that leads eventually to loss of height, stooped posture, and disabling fractures.

The highest incidence of osteoporosis may be found among the 14,000,000 women in the U.S.A. who are 55 years of age and over. Some investigators claim that almost all women past the menopause will show some degree of osteoporosis; furthermore, if all these women were examined carefully, 50 per cent would show x-ray evidence of decreased bone mass.

Suspicion may be the handiest diagnostic tool since presenting symptoms vary from mild to severe and incapacitating pain, and no x-ray evidence of spinal degeneration is available until about 30 per cent of the bone matrix is lost. Between these two extremes there are other signs of estrogen deficiency such as *wrinkled and thinning skin,* a *tendency to appear older than stated years;* there may also be *hypercalciuria* when postmenopausal osteoporosis is complicated by acute osteoporosis of disuse.

Osteoporosis is primarily an atrophic condition of bone matrix formation and any factor that depresses osteoblastic activity or retards the formation of protein and connective tissue such as *prolonged immobilization, cortisone therapy,* or *malnutrition* will favor development of osteoporosis in both male and female.

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"FORMATRIX" – each tablet contains:

Conjugated estrogens equine ("Premarin"®)	1.25 mg.
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Dosage: 1 tablet a day – In the female, three weeks of treatment with a rest period of one week between courses is recommended.

Supplied: Tablets, bottles of 60 and 500.

LITERATURE AVAILABLE ON REQUEST

1.

EARLY POSTMENOPAUSE
No x-ray evidence of bone lesion

2.

LATER POSTMENOPAUSE
X-ray reveals compression fracture of lower vertebrae

3.

70 AND OVER
X-ray reveals fracture of neck of femur

TO RELIEVE LOW BACK PAIN – TO PROMOTE HEALING OF FRACTURES

in osteoporosis

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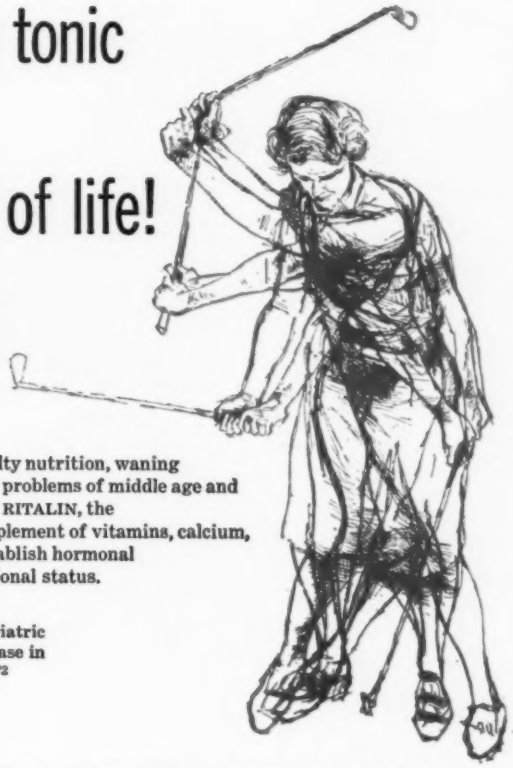

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References: 1. Natenshon, A. L.: J. Am. Geriatrics Soc. *6*:534 (July) 1958.
2. Bachrach, S.: To be published.
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1. Kolomeyer, N.: J. Amer. Geriat. Soc. 6:415, 1958. 2. Levy, S.: J.A.M.A. 153:1260, 1953.

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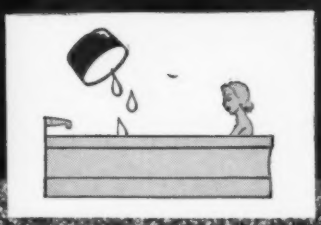

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. Spoor, H. J.: N. Y. State J. Med. Oct. 15, 1958

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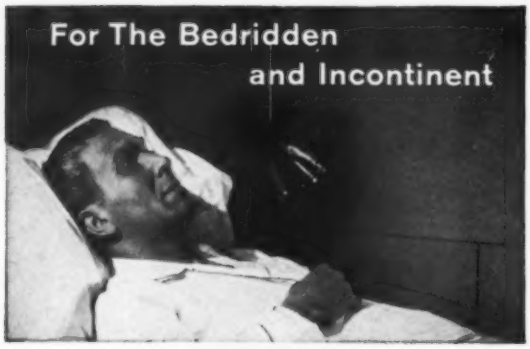

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(1) Smigel, J.O.: M. Times 83:408, April 1955
(2) Smigel, J.O., et al: J. Am. Geriatrics Soc. 5:671, July 1957
(3) Craven, D.M.: Am. J. Nursing 56:1293, October 1956
(4) Nagamatsu, G., et al: Geriatrics 4:5, Sept.-Oct. 1949
(5) Barwise, C.M., Caron, M.A.: Mental Hospitals 3:6, June 1952

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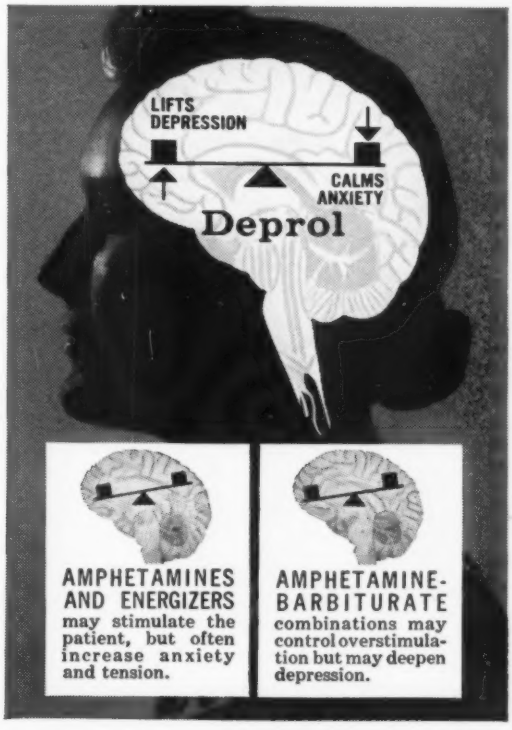

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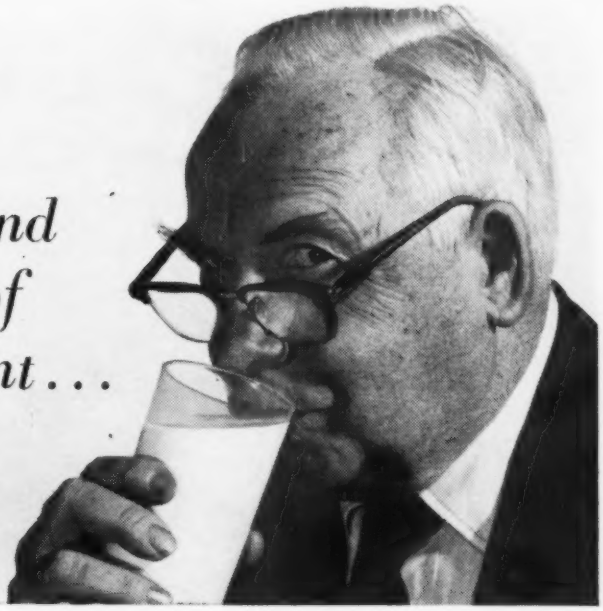

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1. Gould, W. L.: Impotence, M. Times 84:302 Mar. '56.
2. Personal Communications from 110 Physicians.
3. Milhoan, A. W., Tri-State Med. Jour., Apr. '58.

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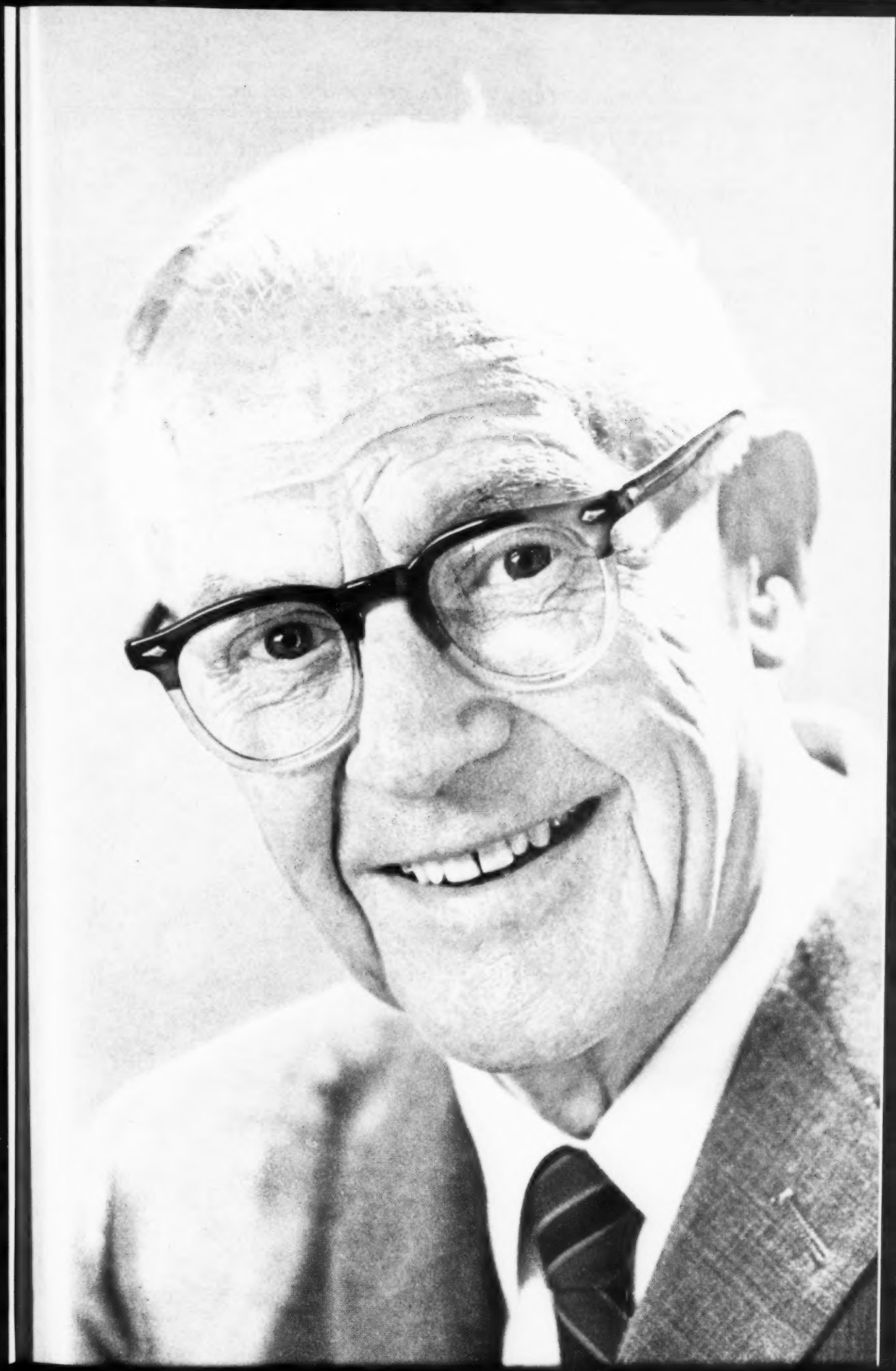

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Noctec....19
Pentids "400"....25

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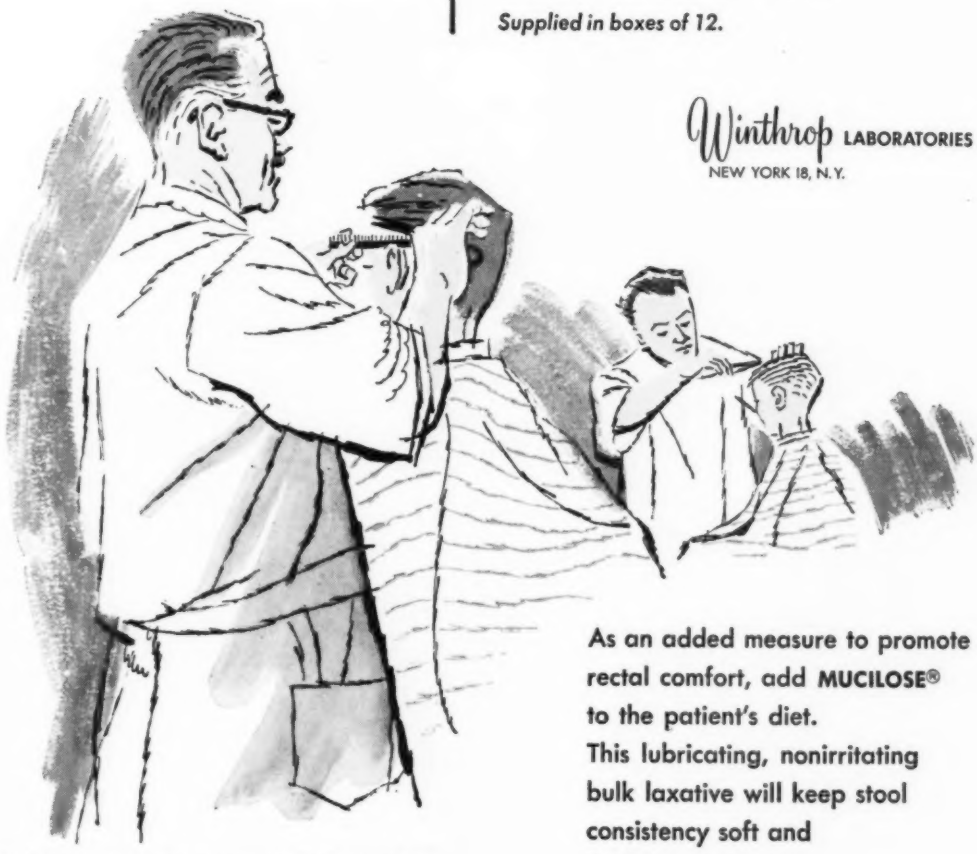

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